

Paddled and Oared Ships Before the Iron Age

THE EARLIEST evidence for seafaring in the Mediterranean region are flakes of obsidian from the Aegean island of Melos found in the upper paleolithic and neolithic levels (eleventh–fourth millennia BC) of Franchi Cave in the southern Argolid. As Melos was never connected to the mainland, the obsidian could only have reached Franchi by means of water transport. Perhaps only slightly later in date than the obsidian at Franchi is the kill-site of *Aetokremnos*, located on the Akrotiri peninsula of northeastern Cyprus.¹

It is not clear how paleolithic seafarers came to know that there was obsidian on Melos. The most reasonable assumption is that considerable seaborne exploration was taking place and that Melos was only one island of many visited by paleolithic and early neolithic seafarers. The lack of established paleolithic living sites on Mediterranean islands, however, apparently had less to do with seafaring capabilities than with the inability of cultures following a hunter/gatherer economy to exist on islands with limited resources.

These prehistoric seafarers left no depictions of their ships. The vessels used for their paleolithic voyages may have resembled *papirella* – primitive reed rafts that are still constructed on Corfu.² In the summer of 1988, a 6m (20ft) long experimental *papirella* was successfully paddled by its five-man crew from Lavrion, on the southwest tip of Attica, to Melos, proving that navigation to Melos in a reed raft was theoretically possible.³ Alternatively, skin craft may have been used. Later, the neolithic toolkit allowed for the felling of trees for monoxylons.

How were these paleolithic vessels propelled? In antiquity, several forms of propulsion were known. Poling (punting) and towing were possible in shallow waters; however, only three options were available to blue-water sailors: paddling, rowing or sailing.

In paddling, the paddle is utilised as a lever to transfer muscular energy to the water. Paddlers normally sit in a kneeling posture, facing

the bow, and throw their upper body forward, while using the arm nearest the paddle's blade as a moving fulcrum during each stroke. As paddlers must be situated immediately next to the sides of the vessel to be able to work their paddles, less inboard space is required than in rowing. Due to this consideration, paddling is the typical manner in which narrow vessels traditionally are propelled. Paddling was apparently deeply ingrained among the Aegean seafaring cultures. When images of ships do become available, in the third millennium BC, they primarily depict a long and narrow type of hull which would have been better suited to paddling than to rowing. Furthermore, a tradition of paddling ships during cultic festive races continued in the Aegean as late as the Middle Bronze Age. Paddling was also used for small, canoe-like vessels in the Bronze Age.⁴

A rower faces the vessel's stern and pulls the oar towards the chest while leaning backwards. Rowing is thus a far more energy-efficient mode of propulsion than paddling; it allows the muscles of the lower body to be employed, whereas in paddling only the muscles of the back and arms are utilised. In rowing, energy is transferred to the vessel through the oarlock or grommet against which the oar loom swivels.

The earliest irrefutable evidence for the use of a sail is a painting of a ship on a Gerzean pot from Egypt which dates to the end of the fourth millennium.⁵ The square sail is supported on a pole mast stepped well forward in the ship's bow. In Egypt, the innovation of a sail may have resulted from men observing the impact that wind had on shields that are sometimes depicted in the vessels' bows.⁶ This evolutionary process might explain why early sails used a boom to stretch their foot; the boom may have replicated the bottom frame of a shield.

The introduction of sail itself, however, may have been a much earlier invention. Broodbank and Strasser have convincingly demonstrated that the neolithic colonisation of Crete in the late eighth or early seventh millennium must have been carried out in an organised manner.⁷

To accomplish this feat, a minimum of 15–19 tons of materials – the colonists, their portable belongings, breeding stock and grain – must have been transported in a single season. Moving this amount of cargo would have been exceptionally difficult, if not impossible, were the vessels propelled solely by paddlers. This raises the distinct possibility, but does not prove, that rowing and/or the use of the sail were known forms of propulsion at this time.

The Early Bronze Age (c3000–2000 BC)

Egypt

The Egyptians used seagoing galleys on the Mediterranean for the rapid transport of soldiers for attacks on the Asiatic coast, and for transporting the spoils reaped by these *razzias* back to Egypt. Uni, an officer under Pepi I (VIth Dynasty) describes on his cenotaph at Abydos how he employed ships to land his military contingents:⁸

When it was said that the *backsliders* because of something were among these foreigners in *Antelope-Nose*,⁹ I crossed over in transports

Abbreviations in the footnotes are given in the references at the end of the chapter.

1. Cherry 1990, pp152–154 and there additional bibliography.

2. Tzalas 1989.

3. Tzamatzis 1987.

4. Doumas 1992, pp78–79.

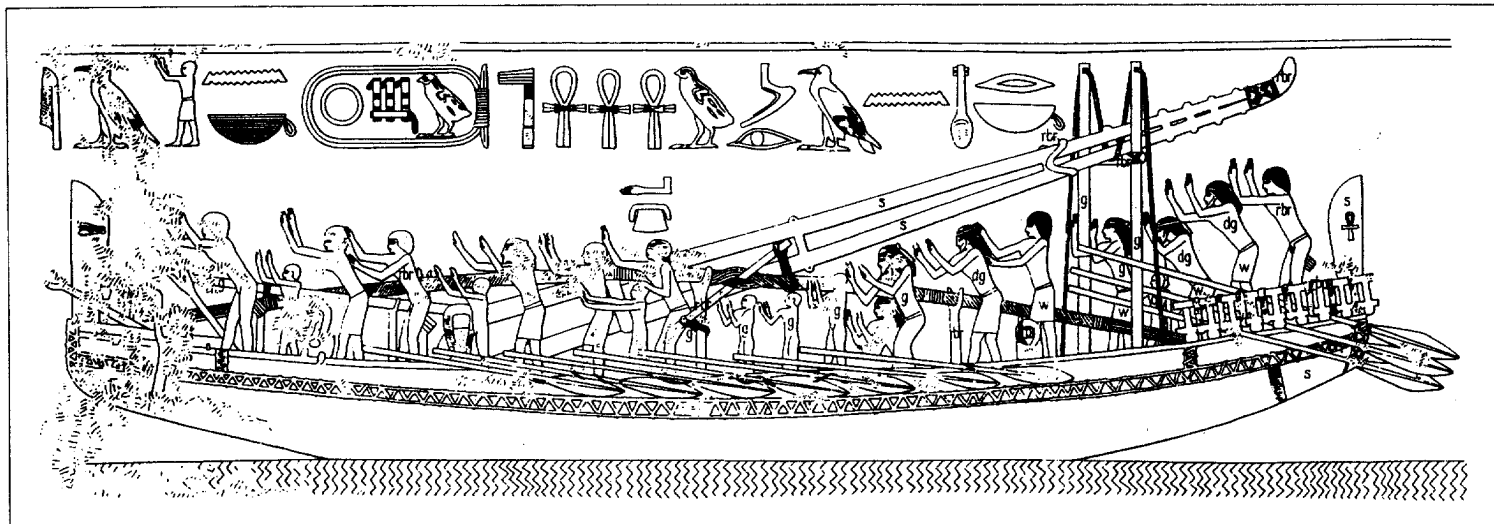
5. Basch 1987, p50, fig 79.

6. Le Baron Bowen 1960, pp119–120.

7. Broodbank and Strasser 1991.

8. *ANET* 3, p228. Uni was sent five times to quell insurrections in the 'Land of the Sand-Dwellers'.

9. The 'Antelope's-Nose' may refer to a mountain range that protrudes into the Mediterranean. This has been tentatively identified by some scholars as referring to the Carmel Mountain range where it comes down to the sea in the vicinity of Haifa.



One of Sahure's seagoing ships. Note the exaggerated sheer and the vertical stem and sternposts. The hogging truss with its tensioning lever can be seen amidships. (From Borchardt 1981)

with these troops. I made a landing at the rear of the heights of the mountain range on the north of the land of the Sand-Dwellers. While a full half of this army was (still) on the road, I arrived, I caught them all, and every backslider among them was slain.

One important result of these expeditions was the importation into Egypt of many Asians, who were brought to Egypt by the shipload for slave labour.

Another important reason for sailing north was timber. Lacking good indigenous wood, vitally needed for ship construction, building and other purposes, the Egyptians sailed and rowed to the Lebanon for timber. This trade was primarily conducted through the dominant Early Bronze Age port of Byblos. A measure of its importance is that the term 'Byblos-ship' became synonymous in Egypt for any seagoing cargo ship – even if it sailed the Red Sea. There are numerous references to this trade in tim-

ber, the earliest being by the IVth Dynasty pharaoh Sneferu, who mentions the importation of forty ships filled with cedar logs.¹⁰ An inscribed axehead in the Adonis River may have been left behind by one of the vessels involved in acquiring timber during the reign of Cheops or Sahure.¹¹

The earliest known unequivocal illustrations of Egyptian seagoing galleys come from the burial temple of Sahure at Abusir. The ships have an exaggerated sheer, which is an oddly Egyptian characteristic. This sheer may have had some basis in reality, although probably not to the degree shown in the depictions. The ships' stems and sternposts are vertical. The 'Eye of Horus' decorates the stem, an early example of an *oculus*, which in the minds of the ancient mariners enabled a ship to find its path safely.

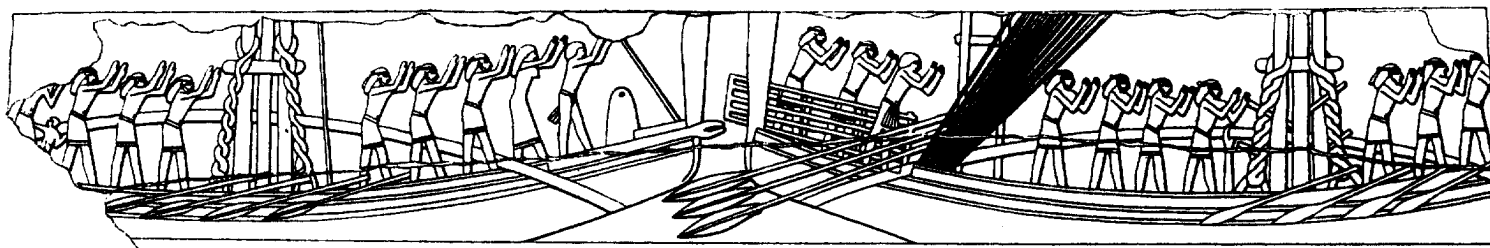
As Egyptian ships of this period lacked keels they required additional strengthening to permit them to stand up to the rigours of blue-water sailing.¹² For this reason, each ship is depicted carrying a hogging truss connected to the ship's extremities and borne longitudinally over a row of massive crutches. Moreover, a band of rope lashing runs the length of the hull directly below the sheerstake. The ships are shown as rowed and sailed. There are up to seven oars on each side, although this number

may be merely symbolic, the actual number of rowers to a side being greater. Lanyards are attached to the upper rim of each oar blade. Three steering oars, lacking tillers, are placed between the stanchions in the stern castle. Presumably, each ship carried six steering oars; the number is indicative of their inefficiency. Masts are lowered on to a crutch positioned in the stern. The masts' bipodal construction may derive from papyrus raft ancestry.

Two additional Old Kingdom seagoing galleys are carved in relief on an ashlar stone recovered from the causeway of Unas, a Vth Dynasty pharaoh. While similar to Sahure's galleys, they are more telegraphic in execution; much of the detail supplied by Sahure's artists is missing here. One notable difference is that the masts, which are stepped, are *tripodal*. Moreover, Unas ships carry only four oars to a side. Again, this number probably owes more to artistic composition than to reality.

The seagoing ships which Egypt used on the Red Sea must have been of lashed construction. These ships had to be built on the

Seagoing ships portrayed on a relief from the causeway of Unas at Saqqara; Vth Dynasty. The tripod masts are a notable feature. (From Hassan 1954)

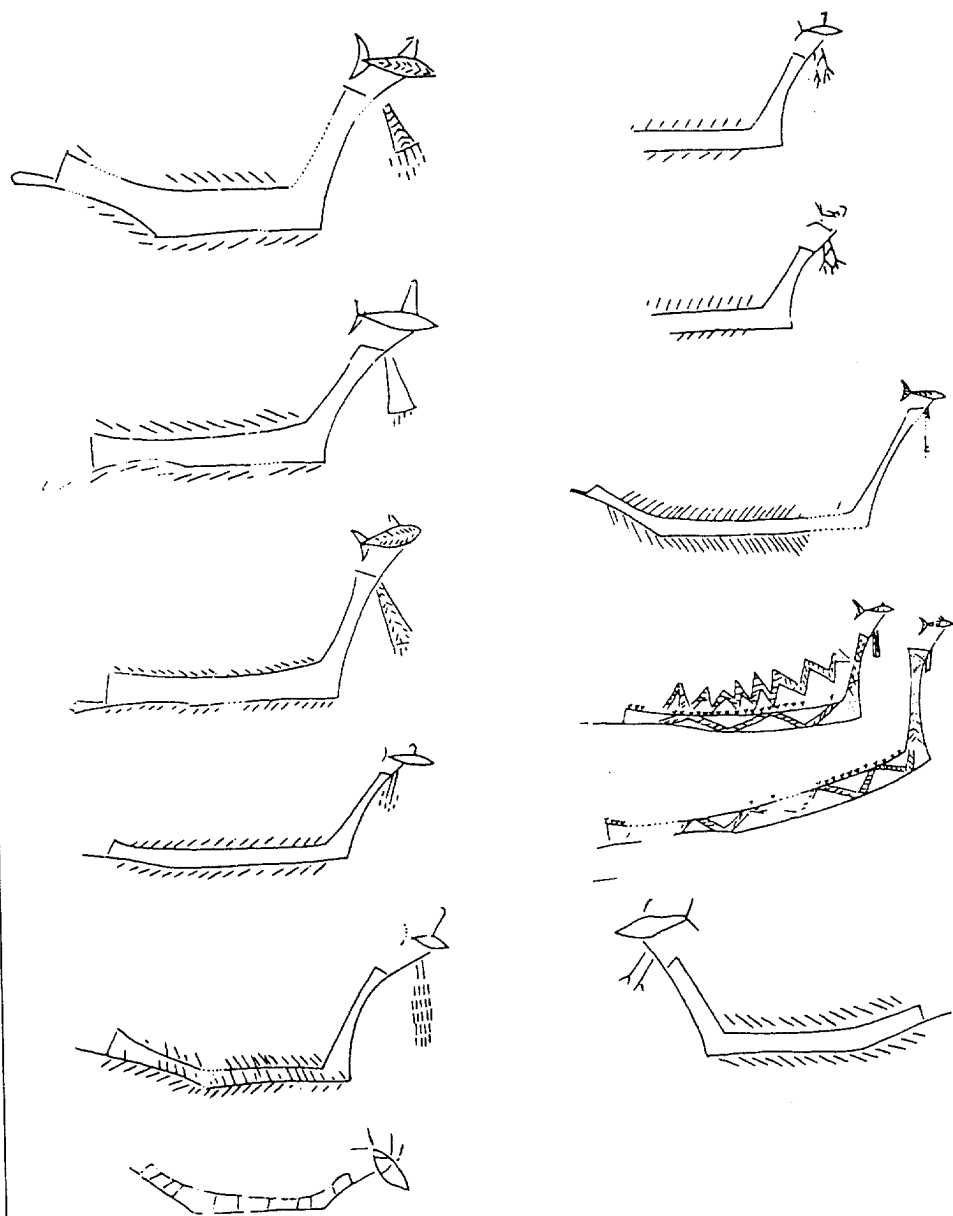
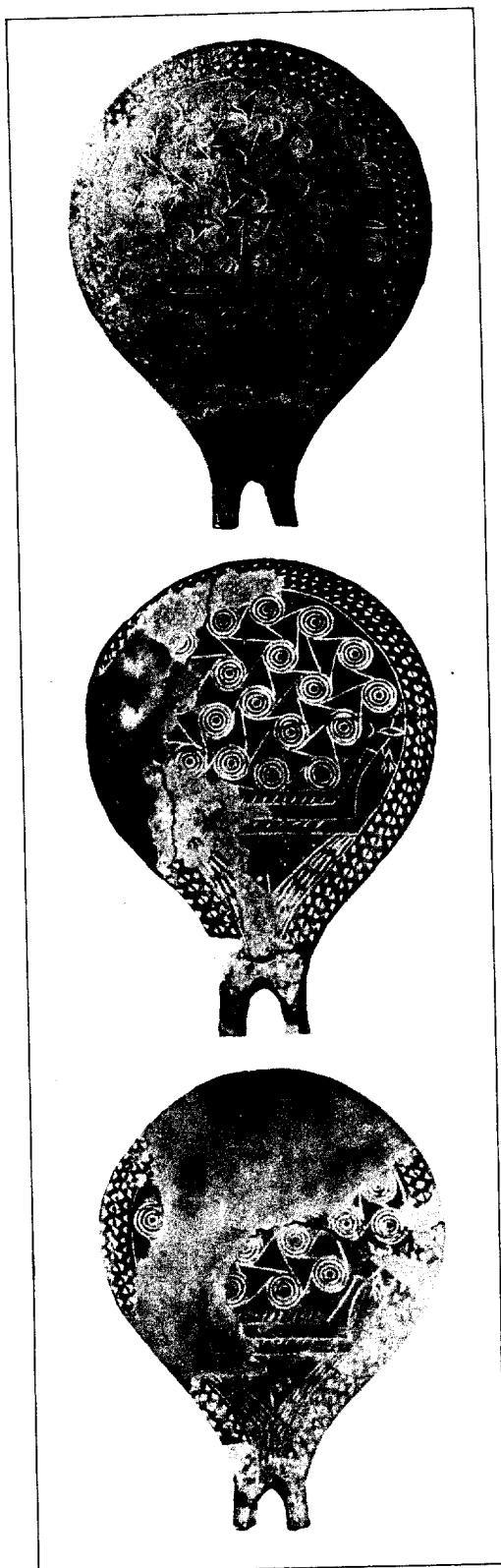


10. ANET 3, p227.

11. Rowe 1936.

12. Greenhill 1976, p62, fig 20; Kennedy 1976, pp159–160.

Three typical Cycladic 'frying pans' with longship motifs. Although highly stylised, the depictions of the ships have a certain consistency. (Shelley Wachsmann)



Ships incised on Cycladic 'frying pans'; Early Cycladic II. (From Coleman 1985)

Nile and then disassembled for transport through the East Desert. They were then reassembled on the shores of the Red Sea.¹³

The ships used by the Egyptians for navigating the Mediterranean were also probably of lashed construction. While lashed and sewn construction was used in many cultures, the Egyptians were apparently unique in lashing their ships laterally through mortises that did not penetrate the external sides of the hull planking.¹⁴ Instead they cut V-shaped mortises through which transverse rope lashings secured the strakes and keel-planks. This ex-

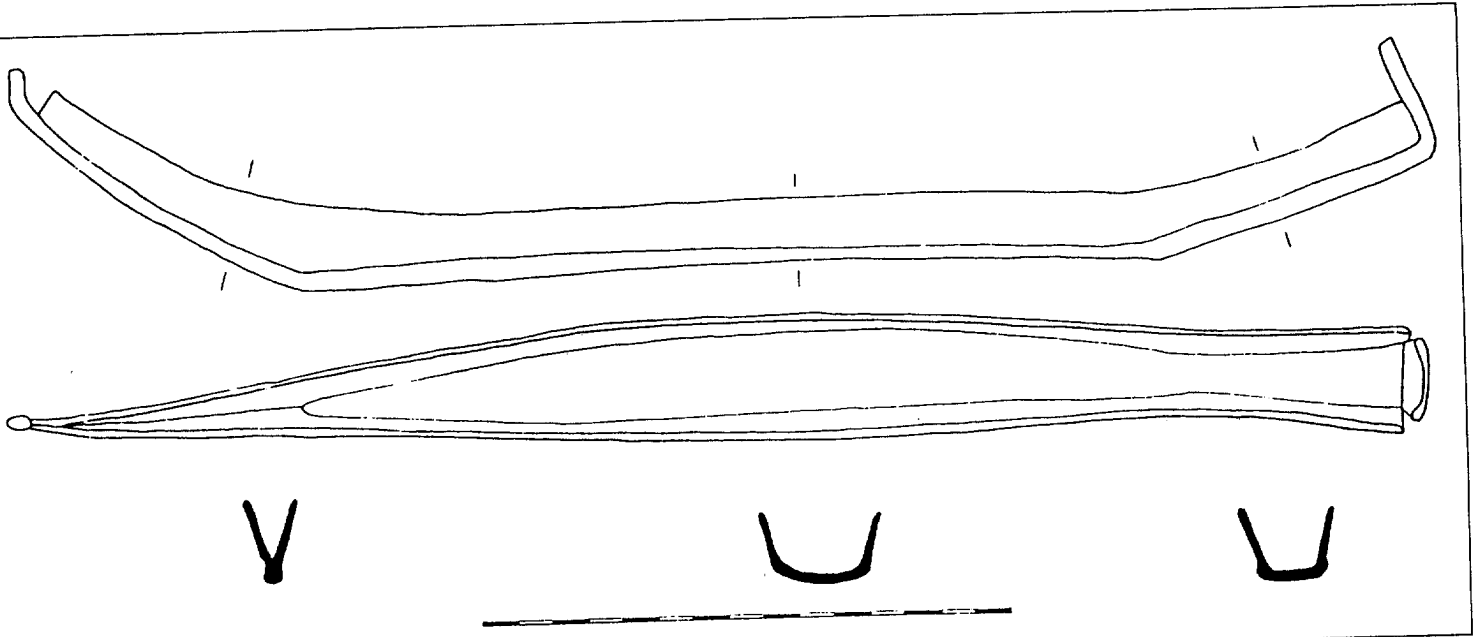
plains why there is no evidence for internal lashing on Sahure's ship depictions.

The ships of Sahure and Unas are shown bringing to Egypt Asiatic captives – men, women and children – depicted in subservient postures. It has been proposed that these Asiatics were actually the ships' crews.¹⁵ This interpretation does not give sufficient consideration

13. Kitchen 1971; Wachsmann, forthcoming.

14. For a recent study of ancient Egyptian ship construction see Haldane 1993.

15. Bietak 1988.



The best preserved of the Naxos lead ship models in the Ashmolean Museum; third millennium. (From Renfrew 1967)

to the fact that in Sahure's relief the Asiatics appear only on ships returning from the Asiatic coast.

The Aegean

Only in the third millennium do images of ships begin to appear in the Aegean. Thus, a greater expanse of time separates the earliest evidence of Aegean seafaring from the first ship depictions there, than from that era to the present day. Two types of vessels are depicted. One appears to be a relatively small vessel with a cutwater at either extremity.¹⁶ The other is a type of seagoing longship.

The latter is perhaps best known from depictions appearing on a group of Cycladic terracotta artifacts that have been termed 'frying pans' due to their unusual shape.¹⁷ Although these enigmatic artifacts are found from Mainland Greece to Anatolia, only those from the Cycladic Keros-Syros culture are decorated with ships. The frying pans may have had a cultic or a ritual function in connection with fertility. This conclusion seems to be supported by the occasional depiction of female genitalia just above the two-pronged handles (legs?).¹⁸ The frying pan ship is narrow in profile. One of its extremities ends in a high post, which is decorated with a fish-shaped de-

vice, from which in most cases hang tassel-like objects. About two-thirds of the length away from the high post, the hull rises at a slight angle from the horizontal. The low extremity finishes off vertically and has a horizontal device extending outboard from it. Rows of numerous short parallel lines depicted on most of these ship images are best interpreted as paddles.

This ship type finds its clearest representation in three metal models from the Cycladic island of Naxos.¹⁹ The models are each constructed from three flat lead strips. One of these, flattened by hammering for two-thirds of its length, forms the bow and lower part of the hull, and two additional strips were used for the sides. The lower extremity is finished off in a vertical transom, indicating that the low end of the ships on the frying pans must be the stern. The somewhat higher bow rises at an angle, although not as steeply as those on the frying pan ships.

Another well-known depiction of this ship

type, made of terracotta, indicates that these ships were also known in Crete. The model has a tear-drop shaped hull with the greatest beam well astern of amidships. The rounded end is presumably the terracotta equivalent of the stern transom of the Naxos models. Like the ships depicted on the frying pans, this model has a horizontal stern projection.

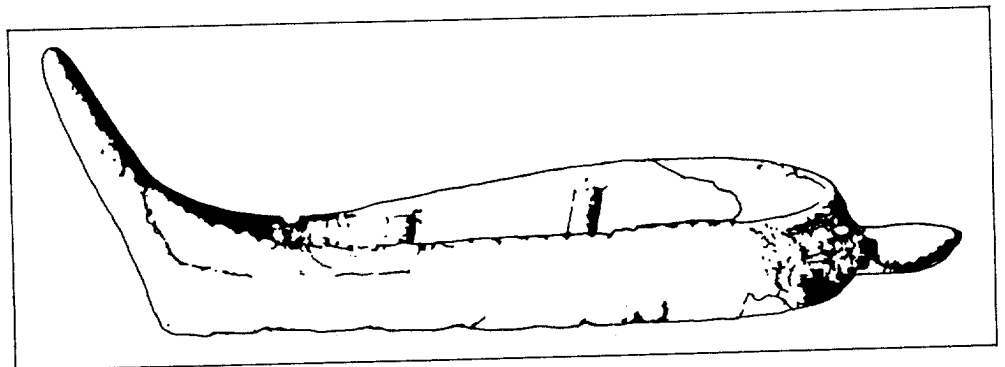
A model made from terracotta normally has a tendency to have more thick-set proportions than the prototype ship which it copies. It is, therefore, likely that the Naxos models give a more accurate view of what the actual ships looked like. The appearance of ships on Cycladic frying pans may indicate that there was a connection between the ships and the

16. Göttlicher 1978, Taf 24, p313.

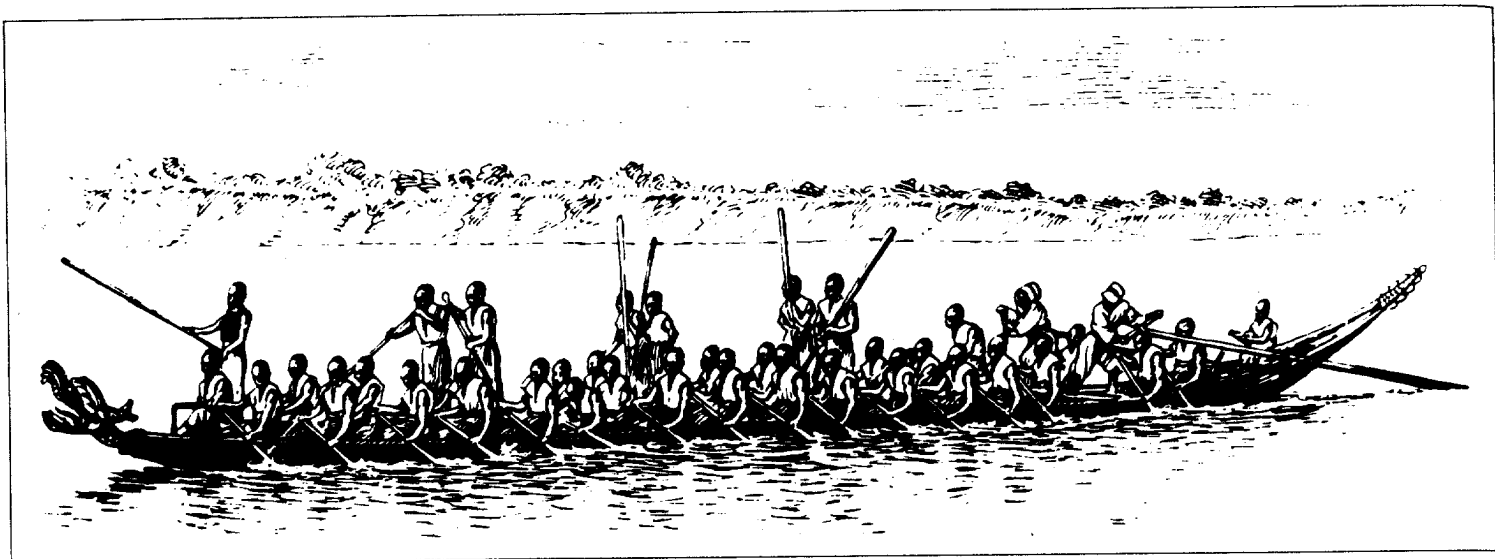
17. Coleman 1985.

18. Coleman 1985, p196, ill 4.

19. Renfrew 1967, p5; 1972, pp318, 356-357, fig 17: 7 and pl 28: 3-4; Casson 1971, pp41-42.



The terracotta ship model from Palaikastro; third millennium. (After PM II:240)



Chinese dragon boat, Yangtze River. (From Bishop 1938)

cult for which the frying pans were created. The large numbers of parallel lines on the frying pan ships, together with the particularly narrow beam of the Naxos models, indicate that there would have been insufficient inboard space to permit rowing these vessels; they *must* have been paddled.

The 'dragon boats' of southeast Asia constitute a fascinating ethnological parallel to these longships.²⁰ Dragon boats are long, narrow vessels – their beam/length generally varies between 1:10 and 1:14 – and are propelled by many paddlers. They carry no sail and, although used on the open sea, they tend to hog due to their exaggerated length. Today dragon boats are used only for ceremonial races, but in the past they were employed for war and piracy.

The Middle Bronze Age (2000–1550 BC)

Egypt

The 'Tale of the Shipwrecked Sailor' relates the adventures of an Egyptian mariner who was the sole survivor of his ship, which sank on a voyage to the mines of Sinai.²¹ This story relates the earliest recorded shipwreck. And, although phantasmagoric in content, it does contain some valuable information on seagoing galleys during the Middle Kingdom.

The protagonist relates that his ship had a crew of 120 men; even if this number is exaggerated, it must refer to a rowing crew. Moreover, the sailor's ship is 120 cubits long by 40 cubits in beam.²² The size of the sailor's ship

need not be an exaggeration as Sahure refers to 100-cubit-long ships which he had built.²³ Furthermore, a 1:3 beam/length ratio is credible, although the ship would be beamy and slow.

There are no known depictions of Egyptian seagoing galleys during the Middle Kingdom, nor from the Intermediate periods that preceded and followed it.

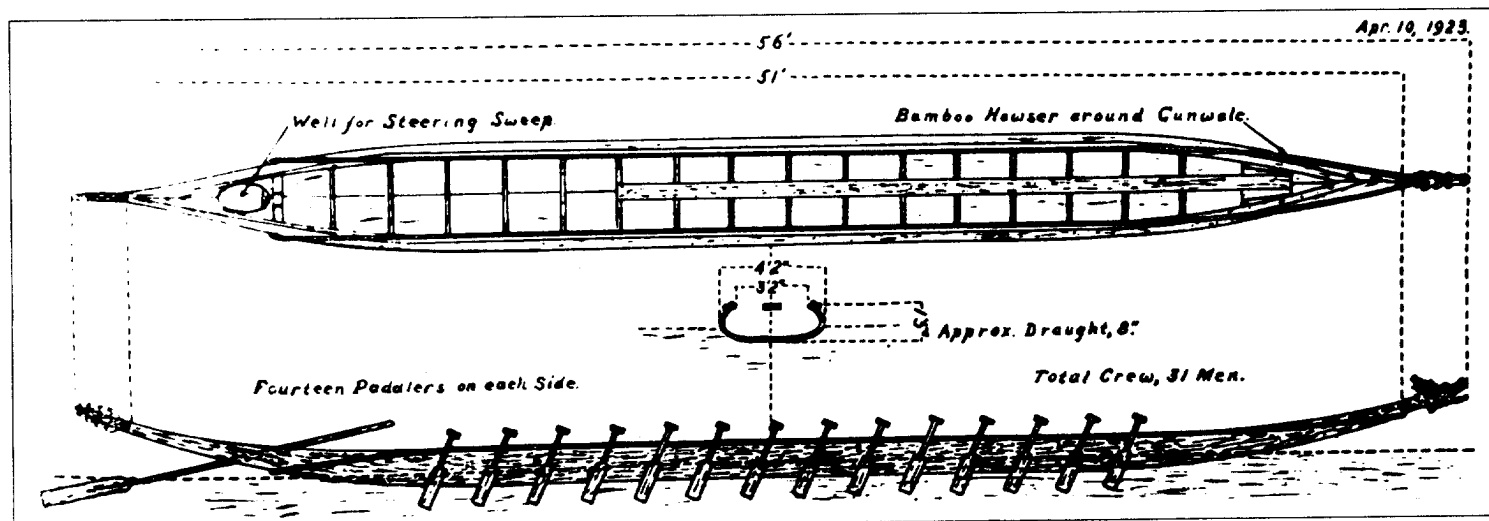
20. Bishop 1938, pp415–424.

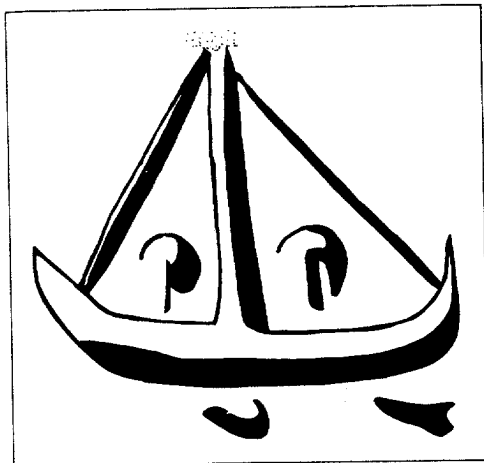
21. *LAE* pp50–56. See most recently Baines 1990.

22. This would make the ship 54m or 63m long and 18m or 21m in beam, depending on whether the regular cubit (0.45m, 1.48ft) or the royal cubit (0.525m, 1.72ft) is intended.

23. *ANET* 3, p227.

Deck and sheer plans of a dragon boat, taken off a boat at Itchang. (From Bishop 1938)





Ship engraved on a Syrian cylinder seal from Tell el Dab'a eighteenth century BC. (After Porada 1984)

The Syro-Cannanite coast

The Phoenicians are considered the seagoing traders of antiquity *par excellence*. In this role, however, they were simply following in the wake of their Syro-Cannanite ancestors, who were undoubtedly major, if not *the* primary, seaborne traders operating in the eastern Mediterranean, at least during the latter part of the Late Bronze Age.²⁴ Syro-Cannanite seafaring trade was also probably a significant factor in the sudden emergence of maritime city-states situated along the southern Cannanite coast in the Middle Bronze Age IIA c2000 BC.

Syro-Cannanite ships are poorly documented at best. Prior to the Late Bronze Age there is only one depiction, of a (presumably) Syro-Cannanite seagoing ship. The tiny ship is

Line drawing of the best preserved ship in the waterborne procession depicted in the south Miniature Frieze at Thera. (From Marinatos 1974)

engraved on a locally made copy of a Syrian cylinder seal, which dates to c1800 BC, uncovered at Tell el Dab'a the Nile Delta. A Syro-Cannanite smiting god is depicted next to the ship.

The ship has a crescentic hull. One extremity (the bow?) curves gently outboard while the other is vertical. A mast is stepped amidships; stays connect it diagonally to the stem and stern. Two oars are depicted beneath the hull, apparently indicating that this is a galley.

Thera: Minoan and Cycladic ships

Of all the cultures that flourished along the Mediterranean's shores during the Bronze Age, there is none so fascinating, nor so enigmatic, as that of the Minoans. The people of this culture, which evolved in Crete and expanded into the southern Aegean, deserve recognition as the ultimate Bronze Age explorers. They traded for tin in distant Mari and presented their wares to the pharaohs. Artisans schooled in Cretan art forms decorated Asiatic and Egyptian palaces with Minoan motifs. A large corpus of Minoan ship iconography had been known since Evans' discovery of Knossos, but it consisted almost entirely of ships engraved on tiny stone seals, most no larger than a thumbnail. A few rough and fragmentary models completed the repertoire. Minoan ships were as enigmatic as the culture that created them.

Then, in 1972, excavations in the Cyclades at the site of Akrotiri on the volcanic island of Thera (Santorini) revealed a remarkably well-preserved settlement that had been covered by volcanic ash when the island's volcano erupted, c1628 BC.²⁵ One of the buildings, termed by

its excavator the 'West House', contained a series of polychrome frescoes.²⁶ The 'Miniature Frieze' in one of its upper rooms shows ships taking part in a nautical race or procession, as well as other naval activities. The Cycladic ships in the scenes are identical, or at least similar in all discernible details, to the vessels known previously from Minoan art. All the vessels in the Miniature Frieze, regardless of their size or the activities in which they are involved, have gently curving crescentic hulls when seen in profile.

The ship procession or race is painted on the south wall of the room. The participating ships are extravagantly decorated. They have struck their sails and some have also unstepped the masts, which lay on a row of crutches. Each ship carries an ornamental stern cabin (*ikria*) and a *stylis*-like pole. Paintings of eight large *ikria* adorn the walls of an adjacent room.

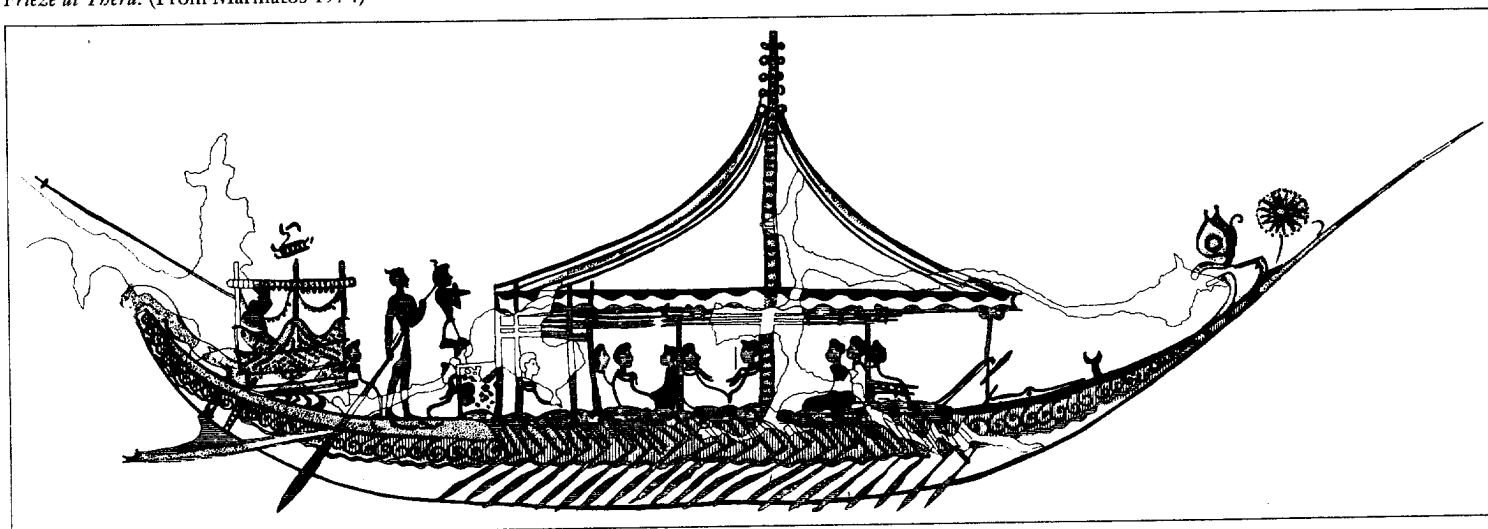
The ships carry a horizontal device, attached to the stern by means of ropes; this device is apparently the same as those carried at the lower extremity of the Early Bronze Age Cycladic longships and is thus an additional indication that the low end of these longships was, indeed, the stern. This device has received numerous nautical interpretations.²⁷ It is

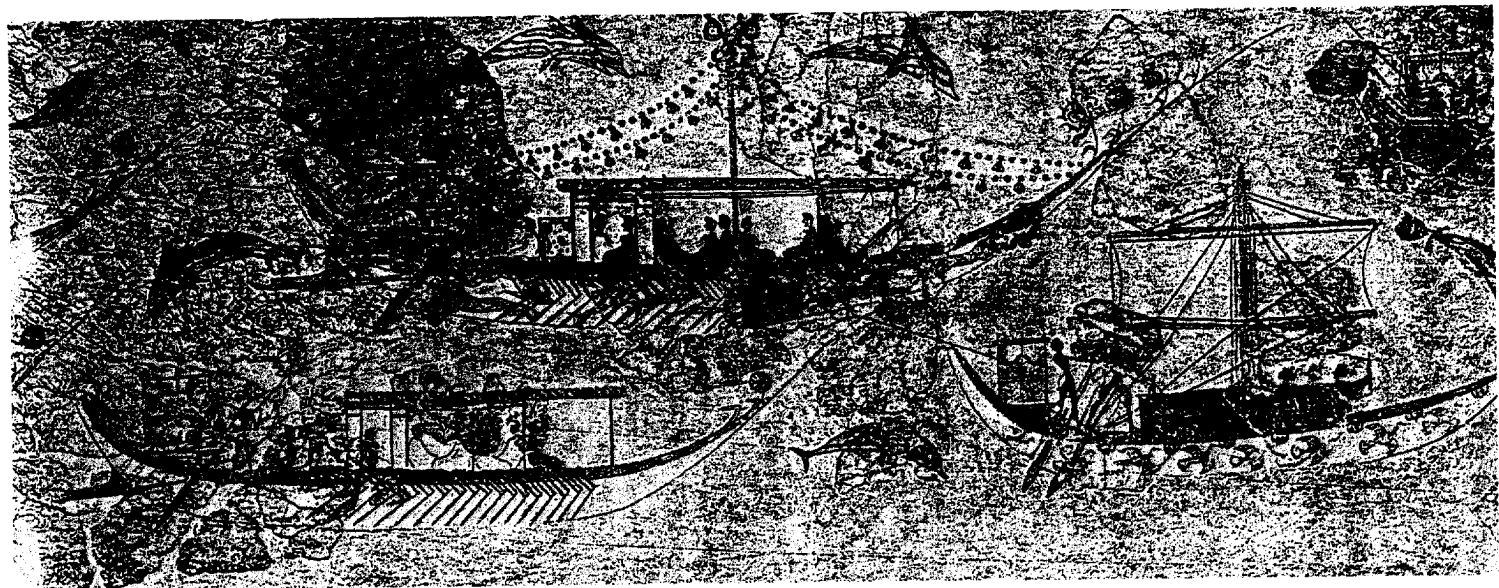
24. This primary importance of Syro-Cannanite traders in Late Bronze Age trade was first proposed by Bass (1967) on the basis of his study of the Cape Gelidonya shipwreck. Recent studies of the textual evidence, Egyptian tomb paintings, as well as archaeological evidence confirm this conclusion.

25. For a summary of the evidence for this date, see Kuniholm 1990.

26. Marinatos 1974.

27. For example, *PM* II, p240; Hutchinson 1962, p94; Marinatos 1974, p50; Morgan 1988, pp135-136; Casson 1975, pp8-9; 1978; De Cervin 1977; Gillmer 1975, p323; Reynolds 1978; Kennedy 1978; Basch 1987, p128, etc.





The waterborne procession in the south Miniature Frieze at Thera. (From Dumas 1992)

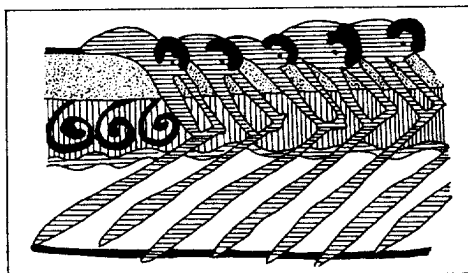
abundantly clear from the Theran material that the horizontal stern device was attached to ships only during cultic ceremonies. Thus, a nautical significance need not be postulated for it.

Perhaps the most surprising aspect of this gay flotilla is that all the ships partaking in the ceremonial race or procession are being *paddled* rather than rowed. The paddlers are depicted bending arduously over the sheerstake to reach the water with their paddle blades, clearly indicating that paddling was not the normal manner by which these vessels were propelled. Furthermore, one of the ships accompanying the flotilla is being rowed.

What are we to make of this intriguing scene? Casson convincingly argues that the

ships are being paddled as an archaic cultic practice, and compares them to the ships in which the classical Athenians sent their em-

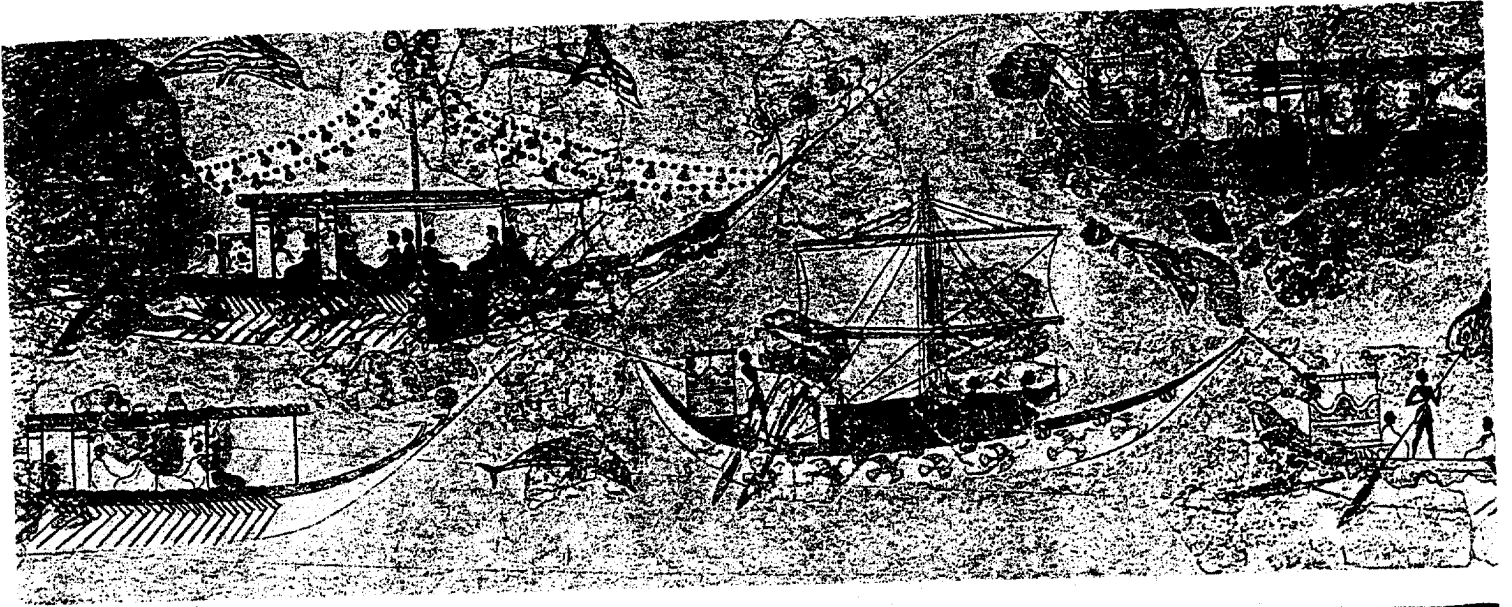
Paddlers in the waterborne procession at Thera bend strenuously over the caprail to complete their stroke. (After Marinatos 1974)



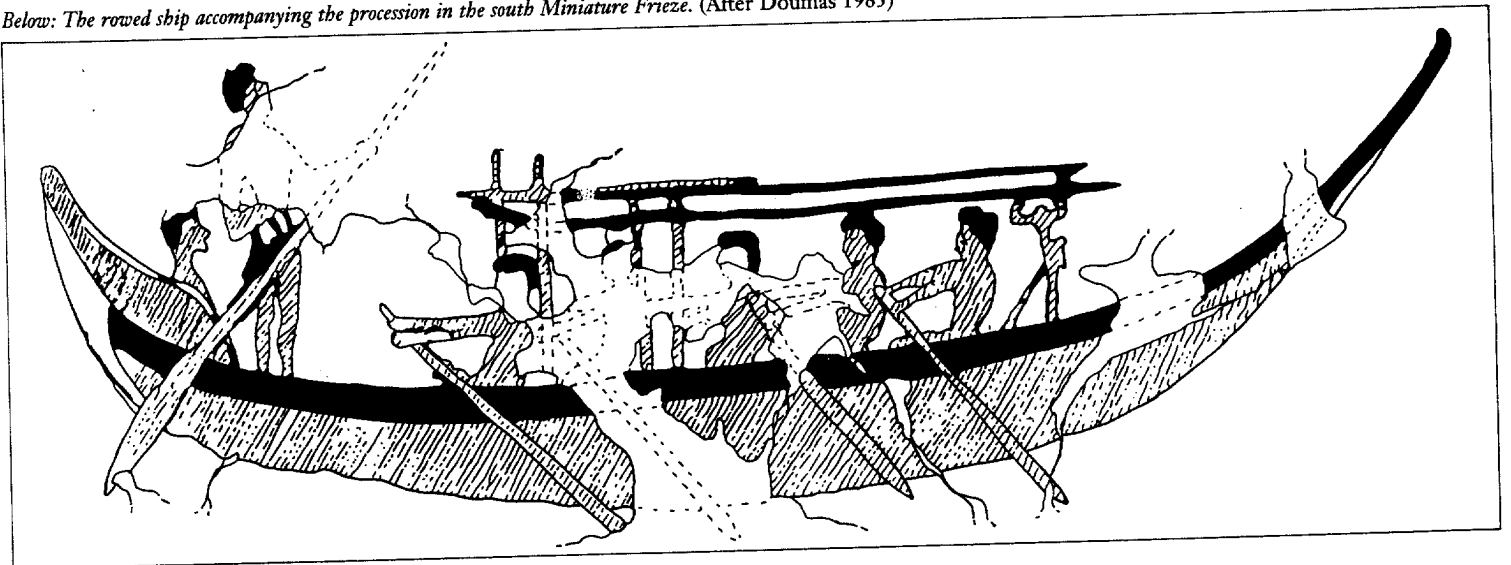
bassy to Delos.²⁸ The ships used for this purpose were so obsolete that the Athenians could claim that it was the vessel that had carried Theseus to Crete. Indeed, the ships taking part in the race/procession exhibit other clues in addition to their outdated mode of propulsion: the horizontal stern devices, the lowered sails and the profuse decorations. These archaic modifications presumably were meant to make ships then in current use as similar as possible to a specific ship type that was used in earlier times for these cult acts.

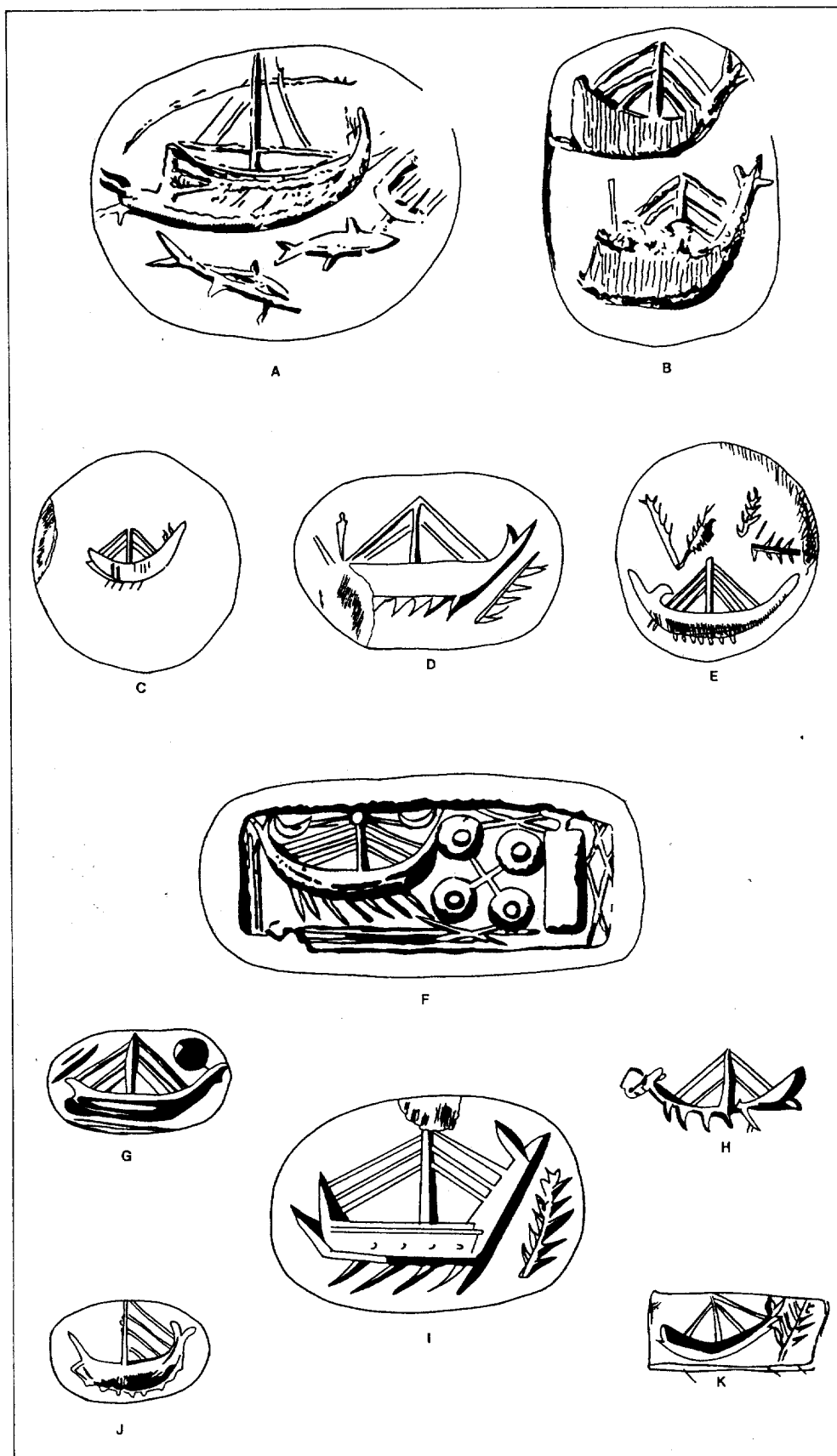
By studying the archaisms we can learn something about the older, prototype ships

28. Casson 1975, p7.



Below: The rowed ship accompanying the procession in the south Miniature Frieze. (After Doumas 1983)





that were being copied.²⁹ These ships would have: a) been paddled; b) lacked sail; c) at least during festivities been profusely decorated and d) carried a horizontal stern device. These characteristics agree remarkably well with third millennium Aegean longships, discussed above. These ships lacked sail and commonly are portrayed replete with decorations and a horizontal stern device. Furthermore, as we have seen, the narrow dimensions of these ships must have required them to be paddled, not rowed.

Rigging is depicted for the first time in the Aegean towards the end of the Bronze Age, but at that time, as well as in the Middle Minoan period, *ships are always shown with their sails lowered*. Moreover, like the Thera ships, they also carry bow decorations and usually have a horizontal stern device. This curious manner of depicting the ships is best explained if the seals depict ships that are taking part in this typically Aegean nautical festival. It is probable that the vessels depicted on these seals represent a ship type that had recently evolved – or, alternatively, had been introduced into the Aegean.

That the third millennium longships depicted on Cycladic frying pans may have played a role in the cult of fertility has been noted above. Sometimes, leafy branches are incised at either side of the female genitalia that occasionally appear on the frying pans. Interestingly, identical branches appear on later Minoan seals. This connection is completed when the same type of branches appear on seals depicting cultic objects, including horns of consecration.³⁰ The dragon boat races of southeastern Asia represent an outstanding parallel to this use of highly decorated ships paddled in cultic contexts.

Based on the above considerations, the following hypothetical reconstruction of events in the Aegean seems to explain the evidence best: 1. During the third millennium seagoing longships of extremely long, low and narrow lines were in use. These craft did not use sails and, similar to modern-day dragon boats, were paddled, not rowed. Apart from their functional use, whatever it might have been, these long-

29. Wachsmann 1980.

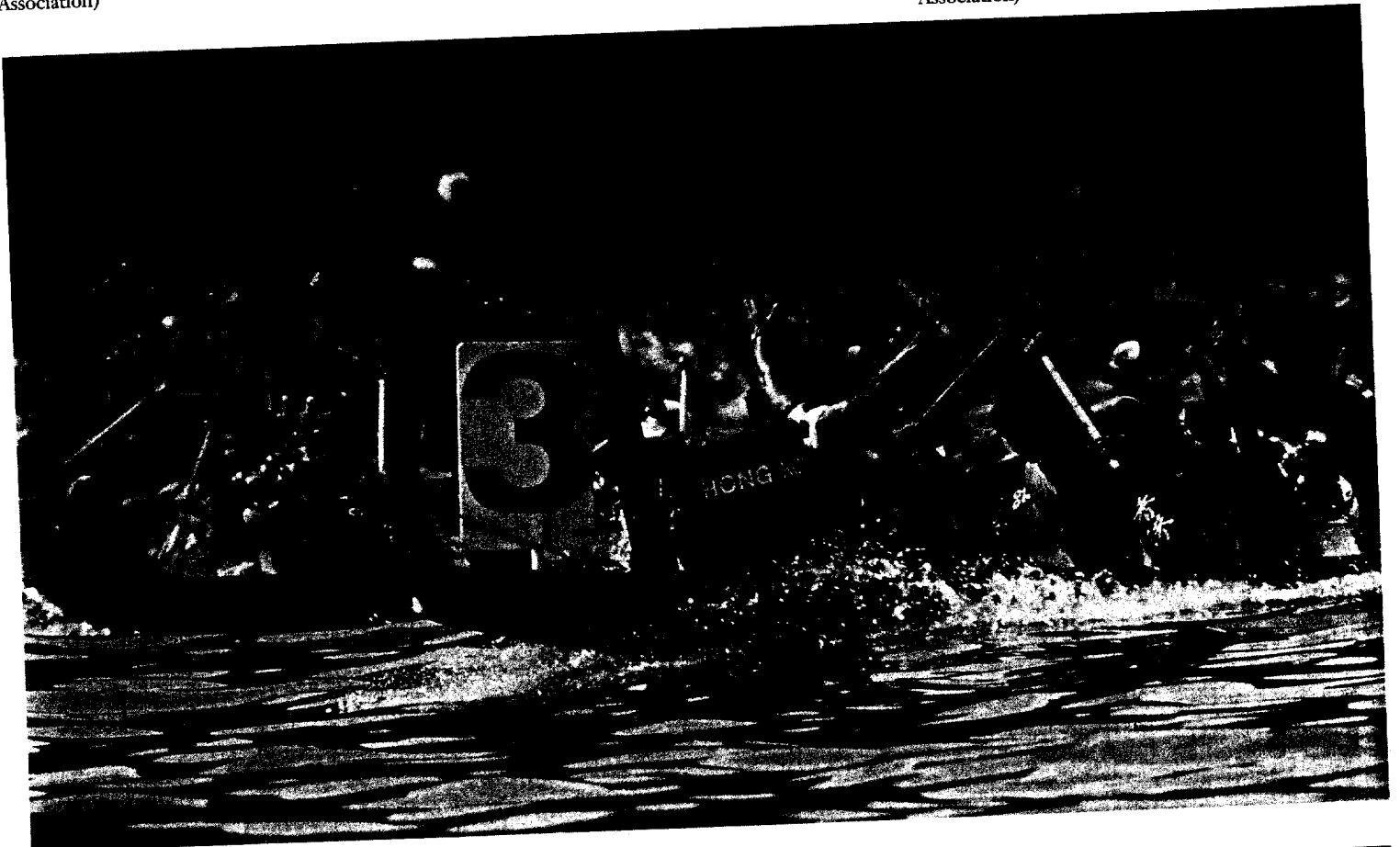
30. Nilsson 1950, pp171 fig 73, 172 figs 75–76, 264 fig 129, 263 fig 128, 273 fig 137.

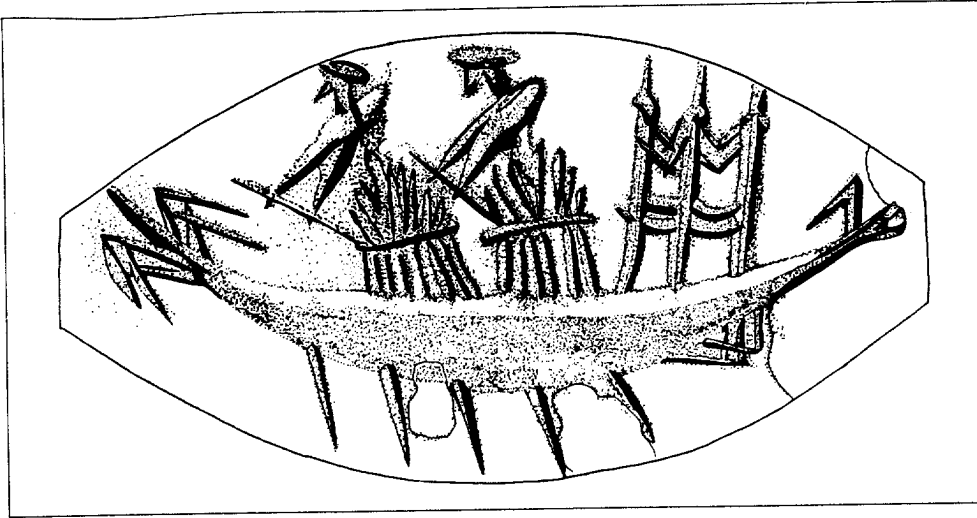
Ships with mast and rigging depicted on Early Minoan III (A-B) and Middle Minoan (C-K) seals. In all cases the sails have been lowered. (A-B after PM II; C-E and G-K after Marinatos 1933; F after Casson 1971)



Above: Modern dragon boats line up prior to a race at Aberdeen, Hong Kong. (Hong Kong Tourist Association)

Below: Dragon boats being paddled during a race. These surviving craft bear a remarkable resemblance to the highly decorated vessels of Thera. (Hong Kong Tourist Association)





Minoan seal from Thebes depicting a ship with two paddlers dressed in sheaves of grain and other cultic accoutrements. (After Morgan 1988)

Detail of the ships and dead bodies in the north Miniature Frieze at Thera. The ship at upper left has made land. Note the oars awash in the surf. The ship below it is still approaching the shore; the looms of four oars are preserved, caught at the beginning of their stroke. (From Dumas 1992)

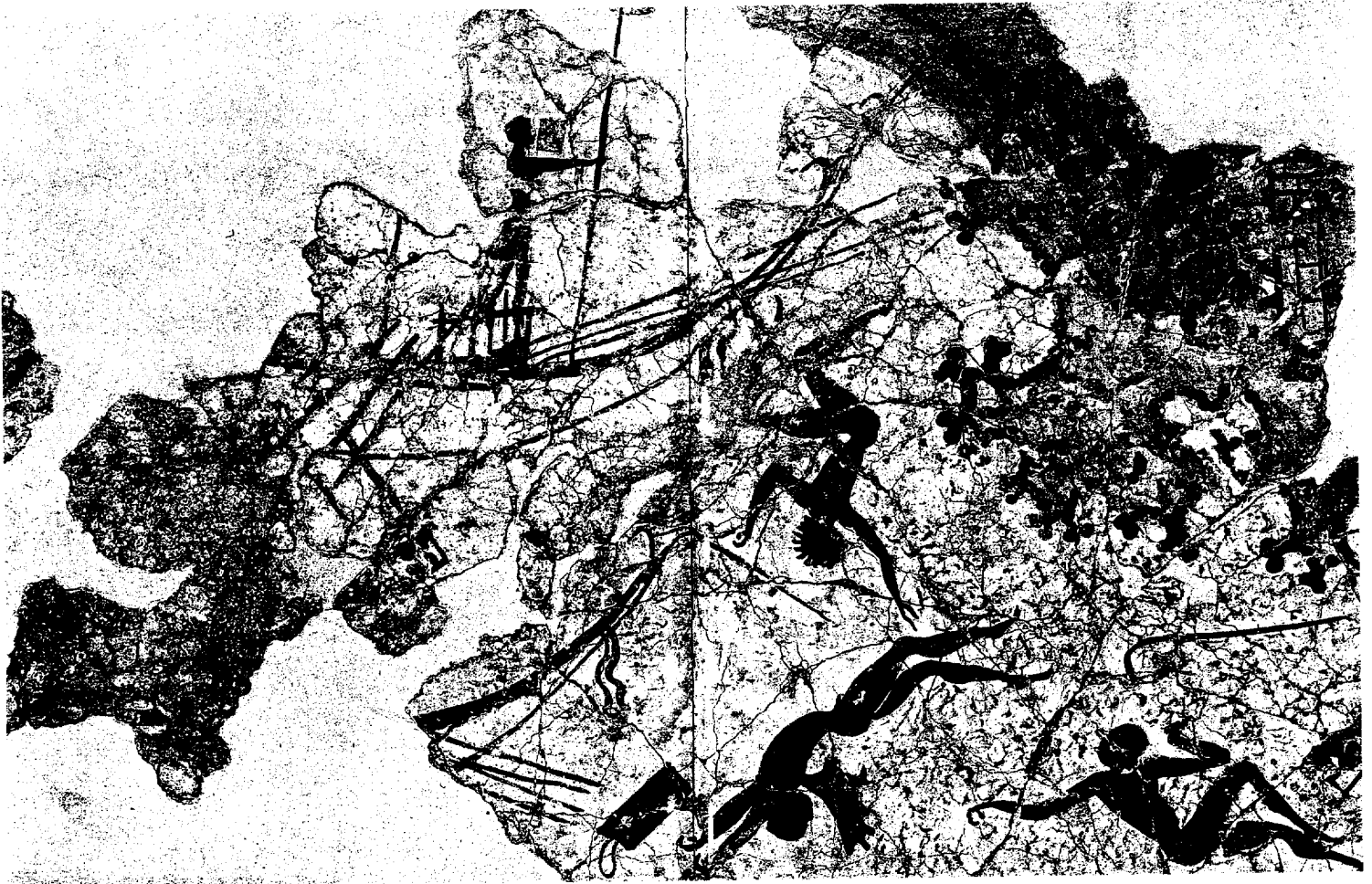
ships served annually in cultic races or processions. Prior to these events the ships were profusely decorated. The ornamentation included the attachment of a horizontal stern device which, even then, probably did not have a functional purpose.

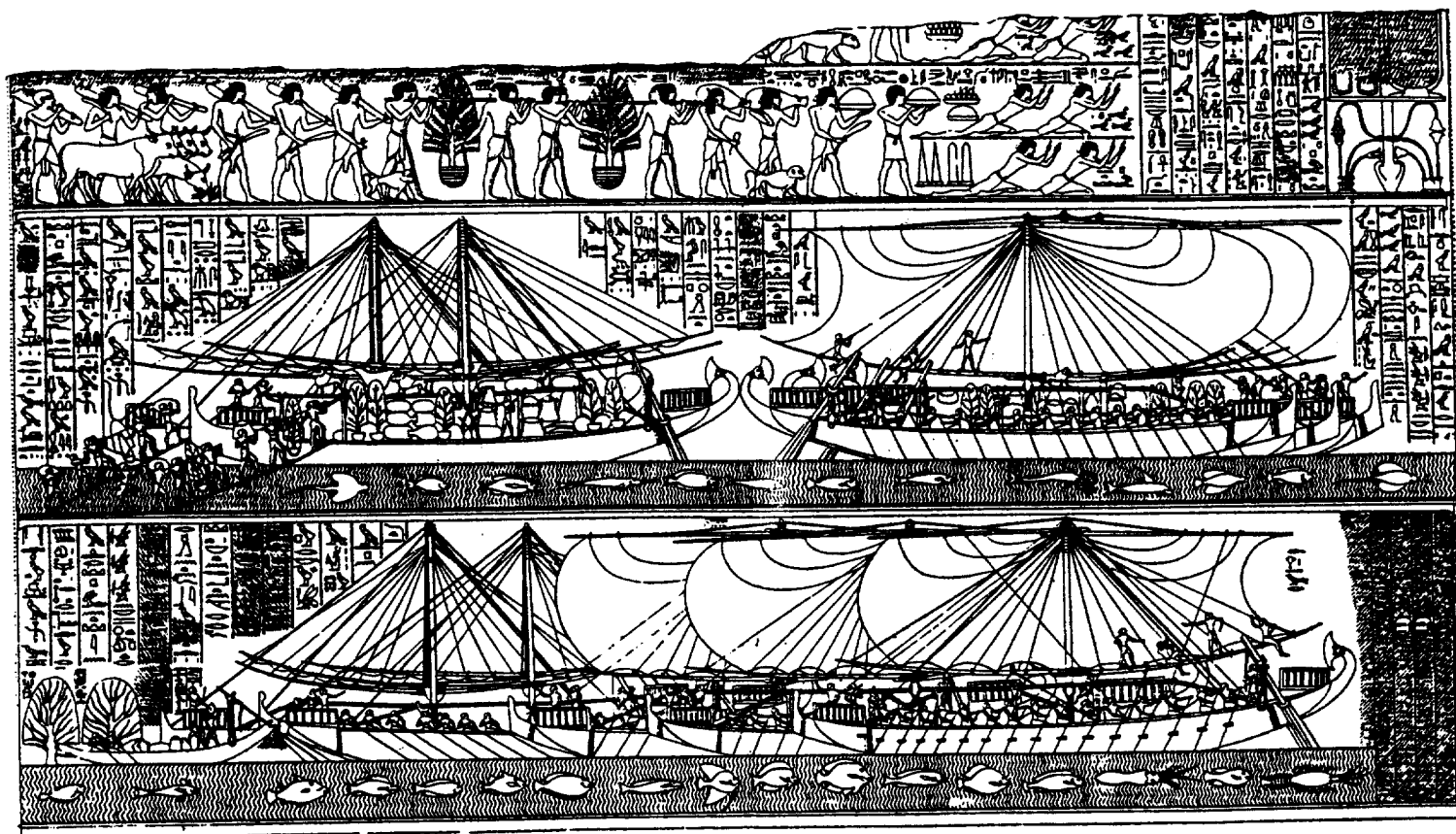
2. Often, the third-millennium longships were depicted in full regalia, perhaps while taking part in the festivities.

3. By the early second millennium, a new type of ship took the place of the longships. The former may have been introduced, although, more likely, it was a natural evolution of the longship.

4. Even though a different type of ship was being used, the waterborne festivities continued, but it now became customary to make the participating ships as similar as possible to the defunct Aegean longships. In their memory, sails were lowered, paddles replaced the oars of daily use and the ships were decorated.

A Minoan seal from Thebes, in Greece, which depicts a cultic ship in full regalia, may be the key to interpreting this cultic custom. The vessel has a double Minoan bird device at the stern. An *ikria* nestles in the stern, and a





horizontal stern device juts out below it. Two figures stand on the vessel, facing the ship's bow as they paddle. Five diagonal lines beneath the hull represent paddles. Thus, this vessel has elements that, at Thera, are connected solely with the ships taking part in the cultic festivities.

The figures are wearing *sheaves of grain*.³¹ These indicate that the waterborne activities were linked to a cultic festival, the main goal of which was engendering fertility. The vegetation cycle was a fundamental aspect of Minoan religion. Apparently, ships played a role in the spiritual striving for abundance.

Portions of four additional ships are depicted on the room's northern wall. A row of soldiers, perhaps the crew of the best preserved ship in this scene, advances inland in single file.³² The inhabitants of a walled settlement located to the left of the soldiers seem totally oblivious to them.

These vessels lack the decorative elements of the processional craft but are otherwise identical to them. The oars of one ship, attached to the caprail, seem to be awash in the surf as a solitary soldier stands guard in the bow. The bow of the ship below it is crossed by four oars depicted at the beginning of their stroke. This makes it clear that the ships taking part in the

procession or race normally used rowers rather than paddlers.

Three dead nude male bodies float in the water. These have generally been identified as the enemies of the settlement who were killed by the soldiers, or as shipwrecked mariners.³³ An alternative interpretation would see these bodies as evidence of cultic human sacrifice.³⁴

The Late Bronze and Early Iron Ages (1550–1000 BC)

Egypt

There are numerous Egyptian references to contact with the land of Punt, located south of Egypt, which was most often reached by the Egyptians via the Red Sea.³⁵ Only Hatshepsut, c1479–1457 BC, saw fit to depict in painted relief the details of an expedition which she sent to that land. This is fortunate, for it is our most valuable source of information on Egypt-

Hatshepsut's expedition to Punt as depicted in her mortuary sanctuary at Deir el Bahri. The details of the hogging truss, with the reinforcing cables at bow and stern, can be seen clearly. (From Säve-Söderbergh 1946)

tian seagoing trading galleys in the Late Bronze Age.

The scene illustrates the voyage to and from Punt of a fleet of possibly five vessels, although the exact number of ships that took part is impossible to determine. The naval part of the expedition is depicted in two registers which contain four temporal movements. The action flows clockwise from bottom right, where the ships leave for Punt, to lower left, where the ships unload their trade goods on to a ship's boat to be ferried ashore. In the upper right, the ships are in the process of being loaded with a variety of commodities of great value to

31. For a parallel to this dress worn by a figure in a boat, see du Plat Taylor, Seton Williams and Waechter 1950, p118 fig 29: 7.

32. For the most recent reconstruction of this scene see Televantou 1990.

33. Marinatos 1974, pp45, 54; Marinatos 1984, p40; Morgan 1988, pp150–154.

34. Wachsmann, forthcoming.

35. Säve-Söderbergh 1946, pp8–30; Kitchen 1971.

the Egyptians. Above this scene is the following inscription:³⁶

The loading of the ships very heavily with marvels of the country of Punt; all goodly fragrant woods of God's-land, heaps of myrrh-resin, with fresh myrrh trees, with ebony, and pure ivory, with green gold of Emu (*emw*), with cinnamon wood, khesyt wood, with ihmut-incense, sonter-incense, eye-cosmetic, with apes, monkeys, dogs, and with skins of the southern panther, with natives and their children. Never was brought the like of this for any king who had been since the beginning.

Finally, at upper right, the ships depart and return to Egypt.

The ships are depicted with fifteen rowers to a side. As the human figures seem to be drawn to a scale somewhat greater than that of the ships themselves, it is possible that the number of rowers portrayed may be less than the actual number employed.

Beneath the ships, the sea swarms with various types of fishes and other sea creatures, including lobsters, squid and turtles.³⁷ In fact, it is from these creatures that Hatshepsut's mortuary temple derives its modern name, Deir el Bahri, which in Arabic means 'Monastery of the Sea'. This 3500-year-old diver's guide to the marine life of the Red Sea is the best indication that the ships in Hatshepsut's relief are based on illustrations prepared by one or more artists who accompanied the expedition and recorded the marine life caught by the crew with hook or net, prior to its ending up in the ship's stew.

The hogging truss on each ship is carried over four massive crutches. It is not clear how the truss was attached to the hull, although this may have been accomplished by means of through-beams. Cables were wrapped around the bow and stern where the hogging truss was attached, to prevent the planking from buckling under the enormous strain of the hogging truss.

These ships, shown in profile, appear relatively slender, and indeed the hulls bear a striking likeness to a type of hull that is known from Theban tomb paintings, as well as from models from the tombs of Amenhotep II and Tutankhamun.³⁸ These models have long, nearly horizontal, stem and sternposts and a beam/length ratio of about 1:5. The models do differ, however, in several details from

Hatshepsut's Punt ships: they have a central cabin, their posts are finished in a different manner and they lack hogging trusses.

A terracotta model uncovered at Byblos, apparently patterned after this same type of Egyptian ship, indicates that it was indeed used for blue-water sailing.³⁹ The Lebanese model clearly shows a massive keel-like structure inside its hull which projects outward at bow and stern, but becomes flush with the hull amidships, in the same manner as in the wooden models from the tombs of Amenhotep II and Tutankhamun. This characteristic has been attributed to the desire to have the models stand upright on a flat surface.⁴⁰ That this is not the case is clear because this feature also appears on Hatshepsut's Punt ships – which are painted in relief.

This raises the remarkable likelihood that this feature may indicate that Hatshepsut's ships had a 'developing' form of 'proto-keel'. If so, the Egyptians may have continued using a hogging truss on their seagoing ships because they did not sufficiently understand the keel's use nor appreciate its advantages.⁴¹ Historically, there are numerous cases in which older technologies were used together with technological innovations until confidence was gained in the new system.

Interestingly, this type of keel, one which apparently projected upward into the hull amidships, seems to have been the normative keel form on seagoing Late Bronze Age ships.⁴² A keel protruding beneath the hull prevents slippage to leeward, but Bronze Age mariners may not have been concerned with this aspect of the keel if, with their primitive boom-footed rig, they did not set sail unless the wind came from well abaft the beam.

Perhaps for the same reason these ships did not have shrouds to support the mast and sail laterally, but rather depended on tensioned cables which were wound around the bottom of the mast.⁴³ Thus, the Bronze Age oarsmen were likely to pull at their oars more often, or alternatively, the ships stayed longer at anchor, waiting for following winds, than was the case after the brailed rig came into common use at the beginning of the Iron Age.

Assuming an *interscalmum* of 1m (3.3ft) for each of the fifteen oarsman and an additional 3–4m at either extremity, these ships would have been about 23m (75ft) long. That is, if the number of rowers is not simply a convention.

The rowing of Hatshepsut's Punt ships has been the subject of some scholarly debate. Ballard argues that the vessels were rowed with long sweeps because the oarsmen seem to be standing up to pull their oars.⁴⁴ He believes that the men stood near the ships' longitudinal median line, but underwent foreshortening at the hands of the Egyptian artists.

Four rowing positions are depicted at Deir el Bahri in the scenes of the voyage to Punt, a procession on the Nile and the moving of

36. BAR II: §265.

37. Danelius and Steinitz 1967.

38. Landström 1970, pp107–109; Jones 1990, pp4, 16 Type B, 28–37, pls XVI–XXII, Objects 273, 284, 287, 306, 309–310, 314, 597.

39. Wachsmann, forthcoming.

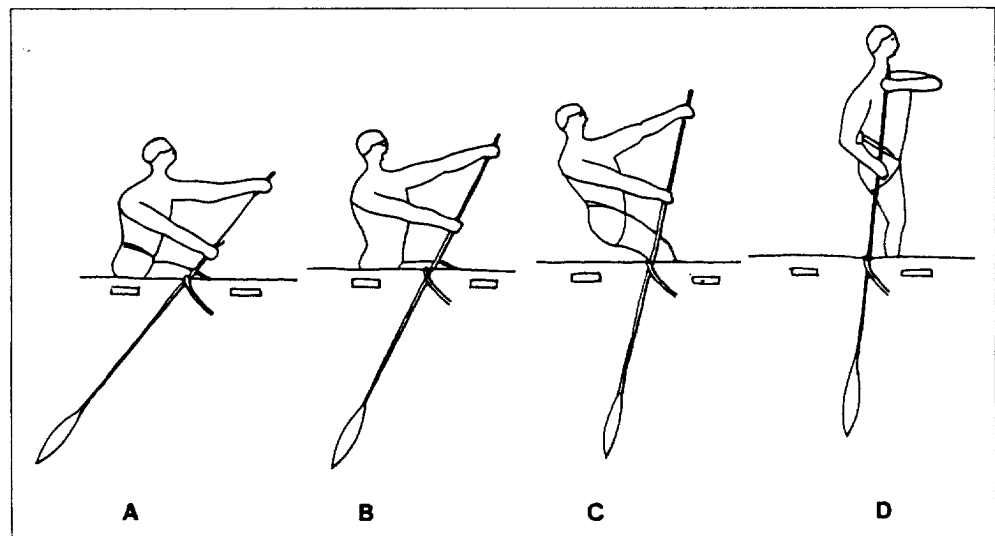
40. Landström 1970, p107.

41. Hocker, forthcoming.

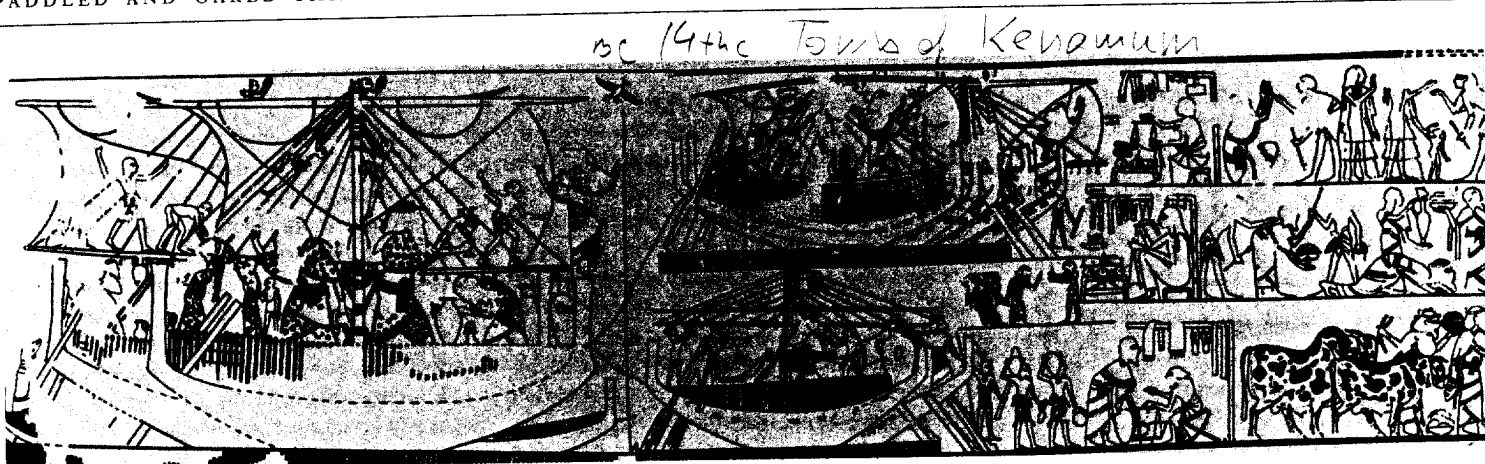
42. Wachsmann, forthcoming.

43. Wachsmann 1990.

44. Ballard 1920, p165.



Four positions of rowers in the Deir el Bahri reliefs.
(After Jarrett-Bell 1930)



Syro-Canaanite merchant ships depicted arriving at an Egyptian port in the tomb of Kenamun (T 162) at Thebes; Amenhotep III. (From Davies and Faulkner 1947)

Hatshepsut's obelisk barge. Jarrett-Bell used these four positions to reconstruct a single stroke.⁴⁵ The rowers lean forward in a sitting position at the beginning of their stroke (A), with their oars at a 40-degree angle from the vertical. For the following stage (B), they continue to sit and lean forward, but their oars are now at an angle of 28 degrees. Then, in the third phase (C), they stand up and lean backwards with the oars at a 15-degree angle. Finally, in the last phase (D) they stand erect, with the inboard arm pressed against the chest and the oar at a 9-degree angle. Jarrett-Bell concludes that the oars must have been turned sideways on the return stroke and never left the water, resulting in a short and choppy stroke. One possible advantage of this type of stroke, however, is that the men would have been positioned near the sides of the hull, giving more room for storing the cargo on deck, as seems to have been the case.

Still, Landström considers the positioning of the oarsmen to be the result of Egyptian artistic conventions.⁴⁶ As he points out, Egyptian models complete with rowers depict the oars lifted high above the water, possibly indicating that rowing was carried out in the normal manner. Egyptian rowers used two types of chaffing gear, which had a square patch of leather for a seat, surrounded by a leather net.⁴⁷ This garment could be worn by itself, or over a linen garment.

The Syro-Cannanite coast

The most detailed depictions of Syro-Cannanite ships that have come down to us are painted on the walls of the tombs of two Theban notables, Kenamun and Nebamun.⁴⁸ In these scenes, the ships are apparently wind-

driven sailing ships, pure and simple. There is no evidence for oars or rowers. Information on Syro-Cannanite galleys is limited, and what little there is comes from Ugarit. This major Late Bronze Age sea port and entrepôt is located north of the modern Syrian port of Latakia. Numerous documents dealing with nautical matters, written in Akkadian as well as in the local alphabetic Ugaritic script, have been uncovered here.⁴⁹

One text lists the crews of three different ships. Of these, one, owned or perhaps captained by a man named Abdichor, has a crew of eighteen men who have been called up from three different communities. We do not know the reason for which they are being recruited. The number for the crews of the two other ships are damaged but may be restored also as eighteen men each. These presumably refer to rowing crews. Another text is a list of ship's equipment which includes an entry of 'nine oars'. If the word for 'oars' (*mt tm*) is in the dual form as suggested by Heltzer, then assuming one rower to an oar, the resulting eighteen oars correspond to the crew of Abdichor's ship.⁵⁰

These two documents, taken together, may indicate that there existed at Ugarit a galley type which was manned by eighteen oarsmen. Nine metres (30ft) would have been required for the rowers located on either side of the ship and at least another 7m were needed at the bow and stern to bring the planking in to the posts. Thus, such a vessel would have been at least 16m (52.5ft) long.

A tiny scaraboid seal stamp found at Ugarit bears the images of two galleys. These have box-like hulls, with a second horizontal rectangular feature located above the sheer. This may represent a screen, a feature which appears prominently on the merchant ships in the Theban tomb paintings. Beneath each hull are five parallel diagonal lines, indicating oars. The ships have vertical stem and sternposts. Above the screen, one ship carries a thick mast and a

yard with downcurving tips. The other depiction shows an off-centre vertical with an enigmatic, pretzel-like object wound around it.

Mycenaean rowers and galleys

Our information on Mycenaean ships derives primarily from numerous iconographic depictions and to a lesser degree from textual evidence. The Mycenaeans wrote an archaic type of Greek in the 'Linear B' script.⁵¹ The documents are primarily inventories and receipts kept by the palace bureaucracies. Despite their laconic nature, scholars have been able to learn much about Mycenaean life and palace administration from these modest documents, some of which deal with subjects pertinent to seafaring.⁵²

One of the two largest groups of Linear B tablets, totalling about 1200 tablets, was uncovered at the palace of Pylos in Messenia. From the beginning of research on the Pylos documents, some scholars felt that the tablets contained allusions to a 'state of emergency'. This impression is derived from several considerations:⁵³

45. Jarrett-Bell 1930.

46. Landström 1971, p69.

47. Säve-Söderbergh 1946, pp75-79 figs 13-15.

48. Davies and Faulkner 1947; Säve-Söderbergh 1946, pp54-56; 1957, pp25-27, pl XXIII; Wachsmann, forthcoming.

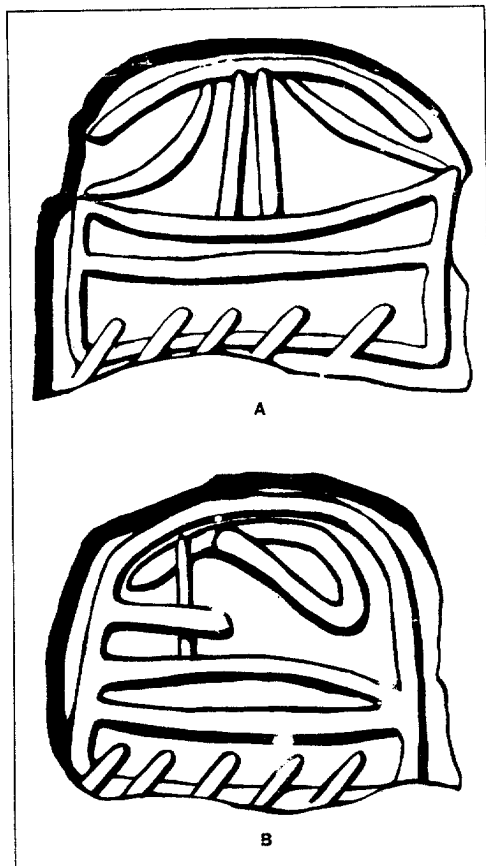
49. For the most recent collection of the Ugaritic and Akkadian texts dealing with nautical matters, see van Soldt and Hoftijzer, forthcoming.

50. Heltzer 1982, pp188-190.

51. Ventris and Chadwick 1973; Chadwick 1976. On the decipherment of Linear B, see Chadwick 1958; 1987B, pp12-21.

52. Palaima 1991 and additional bibliography there.

53. Ventris and Chadwick 1973, pp183-185, 357-358; Chadwick 1976, pp173-179; Chadwick 1987A; Palmer 1956; 1965, pp143-154; Baumbach 1983.



*Ships on a seal from Ugarit; thirteenth century BC.
(After Schaeffer 1962)*

1. One group of texts, known collectively as the *o-ka* ('Command' or 'Military detachment') tablets, contains lists of men who are assigned guard duty along the coast. The title of one tablet (An 657) reads: 'Thus the watchers are guarding the coast.'⁵⁴ It seems reasonable to assume from this that the Pylian high command was aware of an external danger that could come by ship.

2. Bronze, apparently from temple repositories, was being collected for the production of arrowheads and spear points.

3. Linear B tablets were meant for short-term use. No year-dates appear on the tablets, indicating that most, if not all of the tablets refer to the palace's last year. And Pylos was destroyed by a terrific conflagration. In other words, there is good reason to believe that something was afoot, and that the palace bureaucracy was well aware of it.

4. The possibility that one text, which refers to men and women as *po-re-na* who are given, together with metal vessels, to several gods and goddesses, may refer to human sacrifice, possibly under exceptional circumstances.

5. The most fascinating set of enigmatic clues to this puzzle are three tablets in the Pylos An series, which are known collectively as the 'Rower Tablets' after the word *e-re-ta* (rowers) which appears in the headings of all three. In these documents, more than in any others, there seems to be a sense of urgency.

One tablet (An 1) is a list of thirty rowers raised from settlements. Its title reads: 'Rowers to go to Pleuron'.⁵⁵ The five locations from which the men are being mustered are within the palatial domain of the palace at Pylos. The total number of men is interesting, perhaps indicating the crew of a single triacontor (a ship of thirty oars). Homer mentions twenty-oared ships, fifty-oared pentecontors and larger craft, but does not refer to triacontors.⁵⁶ Herodotus, however, mentions that triacontors were used in the early colonisation of Thera.

A second tablet, An 610, is badly damaged. It lists 569 men, but it is clear that numbers are missing in the lacunae, and Chadwick reconstructs an original total of about 600 men.⁵⁷ Such a group of oarsmen would have been sufficient to man twenty triacontors or twelve pentecontors. Here, the men in An 610 are again identified by their settlements. In two cases, groups of forty and twenty men are brought respectively by two notables, one of whom, *E-ke-ra₂-wo*, may have been the ruler of Pylos.⁵⁸ The oarsmen are defined as 'settlers' (*ki-ti-ta*), 'new settlers' (*me-ta-ki-ti-ta*), 'immigrants' (*po-si-ke-te-re*), or by an unidentified term (*po-ku-ta*).

Killen has shown that the call-up in An 1 and An 610 is based on a specific draft system.⁵⁹ Four sites are mentioned in the same order in both An 1 and An 610, indicating a close connection between the two documents. The number of rowers taken from the settlements in An 1 are proportional to those taken from the same towns in An 610 at an approximate ratio of 1:5. Thus, it seems that each settlement contributed rowers based on a proportional evaluation of its reserve duty requirements.

The last of the three documents, An 724, deals with rowers who are missing from the muster. This tablet is also badly damaged and there are many erasures at line ends. One of the men missing is identified as a 'settler who is obligated to row' (*ki-ti-ta o-pe-ro-ta e-re-e*).⁶⁰ On the tablet's *verso* the scribe drew a graffito of a ship or boat, which has a semicircular object (construction?) located amidships and bough-like items extending from the ship's right extremity (bow?).⁶¹ Interestingly, this is not a typical Mycenaean oared ship. Rather, it finds its closest parallels in Minoan cultic boats and in seven tiny vessels, under paddle or oar,

depicted on a Middle Helladic jug from Argos.⁶²

How should we interpret the Pylos 'Rower Tablets'? Unless we accept that raising a fleet that required hundreds of oarsmen was a normal occurrence at Pylos, then these tablets strongly suggest that something out of the ordinary – something exceptional – was taking place at Pylos just prior to its demise. This impression is further strengthened by the other factors, mentioned above.

Assuming that the Rower Tablets *do* indicate a state of emergency at Pylos in anticipation of a danger approaching from the sea, what purpose might the fleet of galleys have served? The large numbers of men mentioned in An 610 immediately bring to mind thoughts of Troy, Salamis and Actium – of naval battles and piracy. The equating of 'oared ships' with 'war ships' seems obvious. A nautical approach to the problem, however, poses two elementary questions: a) What possible reasons are there for massing rowers? and, b) Of these, which best fits the evidence from Pylos?

Of course, the rowers could have belonged to a naval group meant to engage an enemy at sea before it landed. There are, however, other, non-military, contexts which would require amassing large numbers of oarsmen. To judge from her relief at Deir el Bahri, Hatshepsut required about a thousand oarsmen to man the tow-boats that pulled the barge transporting her obelisks from Aswan to Karnak.⁶³ Such an explanation seems unlikely for Pylos, however. Merchant ships, as we have seen, could be galleys. Thus, fleets of oared merchantmen also would have required the enlistment of many rowers. It seems unlikely, however, given a potentially dangerous situation at home, that valuable ships and men would be sent overseas.

Numerous paddlers, or rowers may be required to take part in ship races. This is a true of the dragon boat races that take place today as it was in Thera in the seventeenth century BC. This explanation is *plausible* for the Pylos

54. Ventris and Chadwick 1973, p189.

55. Ventris and Chadwick 1973, p186.

56. Casson 1971, pp44-45.

57. Chadwick 1987A, p77.

58. Ventris and Chadwick 1973, p265; Chadwick 1976, p71; 1987A, p78.

59. Killen 1983.

60. Palaima 1991, p286.

61. Palaima 1991, fig LXIII: b.

62. Deilaki 1987.

63. Naville 1908, pl CLIII-CLIV; Landström 1971, pp130-131 fig 383.

tablets, particularly as the ship graffito on the verso of An 724 appears to be of a cultic type.

Oared ships were also used in expeditions of colonisation, or for mass forced migration, when insurmountable forces threatened. In classical times, pentecontors were used to transport entire populations and their possessions. Undoubtedly, the most informative example of this phenomenon is Herodotus' description of the Phocaeans escape from Ionia before the advancing Persian army.⁶⁴

... the Phocaeans launched their fifty-oared ships, placed in them their children and women and all movable goods, besides the statues from the temples and all things therein dedicated save bronze or stonework or painting, and then themselves embarked and set sail for Chios; and the Persians took Phocaea, thus left uninhabited.

The Assyrian king Sennacherib describes a similar 'waterborne flight', this time from the viewpoint of the invader:⁶⁵

And Luli, king of Sidon, was afraid to fight me (*literally* feared my battle) and fled to Iadnana (Cyprus), which is in the midst of the sea, and (there) sought a refuge. In that land, in terror of the weapons of Assur, my lord, he died.

In his palace at Nineveh, Sennacherib's artists recorded on stone how Luli and his retinue escaped to Cyprus. In the Assyrian reliefs, Luli's fleet contains both warships with water-line rams, as well as round merchant galleys or transports. Heads of men and women passengers peeking from above the bulwarks indicate that both types of ships were used as transports in this waterborne migration.

Which of these explanations fits the Pylos Rower Tablets best? It seems that the last interpretation is to be preferred. An 610 and An 724 may record preparations for a similar waterborne emigration – of at least certain echelons of the Pylian population – to avoid an overwhelming impending attack. One consideration that may support this interpretation is the repeated identification of the rowers in An 610 and An 724 in terms of land owning, *particularly at a new location* ('settlers', 'new settlers', 'immigrants', and a 'settler who is obligated to row'). These terms would seem to make most sense if the documents are concerned with an act of 'migratory colonisation' in which the rowers who man the fleet are also among those migrating to the new location. The consideration that rowers in An 610 and An 724 are differentiated into 'settlers' and

'new settlers' presumes the previous existence of the site being settled. Perhaps the documents refer to the enlargement of a previous Pylian settlement or region, already organised and controlled by the palace at Pylos.

Let us look at this problem from a different perspective. What might we expect to find at Pylos if it had been abandoned and destroyed by its inhabitants rather than being attacked and pillaged by invaders? Presumably, the migrants would have attempted to take their most valuable possessions with them, together with belongings and livestock most needed to begin life in a new location. Due to limitations of space on board the ships, it is likely that less-important items would have been left behind. Furthermore, as the fleeing residents of the palace of Pylos realised that they would never be returning to the home they were now abandoning, they may have destroyed by their own hand as much as possible of what they had to leave behind, to prevent it from falling into enemy hands. There would be no evidence of an armed struggle as no battle would have taken place. The invaders, if and when they arrived, would find the inhabitants gone, with the abandoned palace empty of valuables, and perhaps even burnt to the ground.

How well does the above scenario reflect the archaeological evidence at Pylos? A study of the artifacts found in the palace at Pylos indicates that all the valuable metal vessels listed in the Linear B Ta Series had been removed from the palace prior to its destruction by fire:⁶⁶ not a single metal vessel of value was discovered in the palace!

One may argue that such 'housecleaning' is the result of methodical pillagers who stripped the palace of all its valuables prior to torching it. This scenario does not give sufficient weight, however, to the consideration that strata of other sites that have ended in destruction, and presumably have been pillaged in the process, will normally contain some valuables. Pillagers are not infallible.

Metal hoards – at least some of which must have been interred for safekeeping with the intention of later recovery – are a particularly common feature of thirteenth-century BC Mycenaean sites.⁶⁷ No hoards, however, were found at Pylos. Indeed, the vast majority of artifacts recovered consisted solely of large quantities of pottery vessels, abandoned in the palace pantries in mint condition. As ceramics could have been easily made from local clay at any given destination, it is highly unlikely that they would have been allotted valuable, and limited, room on board the ships. Furthermore, although Pylos has been excavated ex-

tensively, and many skeletal remains retrieved, not a single human bone was found there. This led Blegen, the site's excavator, to conclude that the inhabitants had escaped Pylos before the palace was destroyed.⁶⁸

Thus, the archaeological evidence can be plausibly interpreted to support a scenario in which the palace at Pylos was abandoned, rather than destroyed by external enemies. Moreover, this interpretation may aid in allowing us to understand the organisational mechanisms that drove the phenomenon of mass seaborne migrations away from the Aegean and into the eastern Mediterranean at the end of the Late Bronze Age.

Clearly, the 'northwesterners' who migrated to Cyprus, Syria and Israel during the upheavals of the twelfth century BC must have come from somewhere, and in doing so must have required some measure of organisation. Thus, the Pylos Rower Tablets may reflect one – palace-orientated, and, therefore, highly organised – form of bureaucratic preparation for a seaborne migration. Considering the estimated size of the kingdom's population, the expedition recorded in An 610 and An 724 probably was only one (and perhaps the last?) of many such expeditions required to transport even a small portion of the estimated population of Pylos, together with their servants, belongings and livestock.

If the above interpretation for the Pylos Rower Tablets is correct, it would have a profound effect on the understanding of the other Linear B documents from Pylos, for it would be highly unlikely that only these three documents, out of all those found at Pylos, refer to preparations for abandonment. Perhaps the most intriguing question that would arise if the people of Pylos abandoned and torched their own palace before sailing off is: where did they go?

For the development of war galleys in later times, the most significant oared ship of the Bronze Age was undoubtedly a type used, and presumably developed by, the Mycenaean culture. This same ship type, as we shall see, was subsequently adopted, apparently with only minor modifications, by the Sea Peoples.

In numerous depictions of Mycenaean ships the single element of ship construction which

64. Herodotus I: 164.

65. *ARAB* II, No 326. See also Nos 239 and 309.

66. Ventris and Chadwick 1973, pp332–348.

67. Knapp, Muhly and Muhly 1988 and additional bibliography there.

68. Blegen and Rawson 1966, p424.



A main element of the architecture of Mycenaean ship depictions looks like a ladder lying horizontally on its side. This is a reserved horizontal space intersected by numerous vertical lines. This aspect of the ship's

construction seems to have been uppermost in the minds of those who portrayed them. Any interpretation of these ships must begin by identifying this element.

seems to have most caught the eye of the ancient artists was a structure situated directly above the sheerstrake. This appears as a narrow horizontal area, always left *unpainted*, which extends almost the entire length of the ship, and is intersected by numerous vertical lines forming what looks rather like a ladder lying horizontally on its side. This was such a prominent feature on Mycenaean ships that, at times, Mycenaean ship graffiti are literally little more than a 'horizontal ladder design'.

Clearly, to reach a definitive interpretation of the architecture of these ships depicted in Mycenaean iconography it is imperative first to understand the function of this part of the ship's architecture, and particularly how it relates to the rowing of these ships. To do so, it is essential to begin by first studying the most detailed known depiction of a Mycenaean ship. This distinction is currently held by a ship painted on a Late Helladic IIIC krater sherd uncovered at Pyrgos Livonaton in east Lokris.⁶⁹ This site, which has revealed a wealth of ship iconography to the archaeologist's trowel, has been equated with Homeric Kynos.⁷⁰

Almost all of the ship survives, with the exception of parts of its extremities. Two armed and armoured warriors, one situated in a bow castle, the other abaft the mast, indicate that this ship is engaged in warfare. The vessel faces left and is divided longitudinally into three distinct sections (CB, BX and XA in the figure opposite). The hull, from the keel-line to the sheerstrake (BC) is depicted in dark red paint. Above this is a reserved area (BX) crossed by nineteen vertical lines forming the familiar 'horizontal ladder design'. However, in this case a 'lunette'-like object is situated next to the right (aft) side of each of the vertical lines.

The third and highest area (AX) is embellished with two rows of semi-circles. Elsewhere on Late Helladic pottery this motif also decorates the bodies of bulls and the leather-covered sides of chariots. This leads to the reasonable conclusion that area AX represents

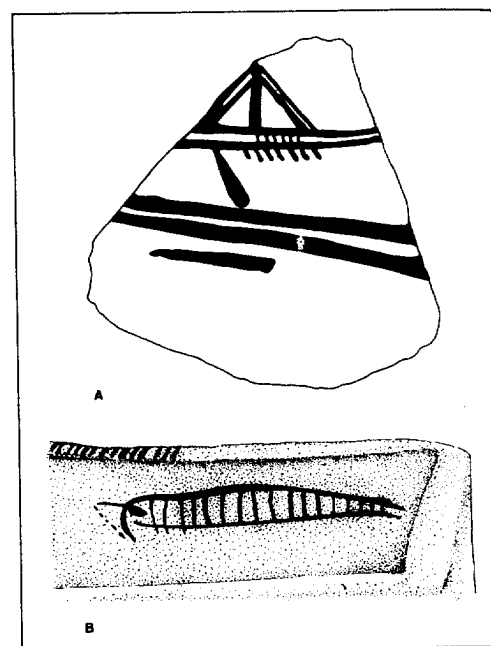
a screen made of leather protecting an open bulwark. Line X continues across the bows, perhaps indicating an element of structural significance. It may be a free-standing wale which would have served as the support for the deck beams and the screen's poles.

As the upper ends of the oars lead straight into the bottoms of the lunettes, these must in some way be related to the ship's oarsmen. The following considerations aid in interpreting the artist's intentions in this matter:

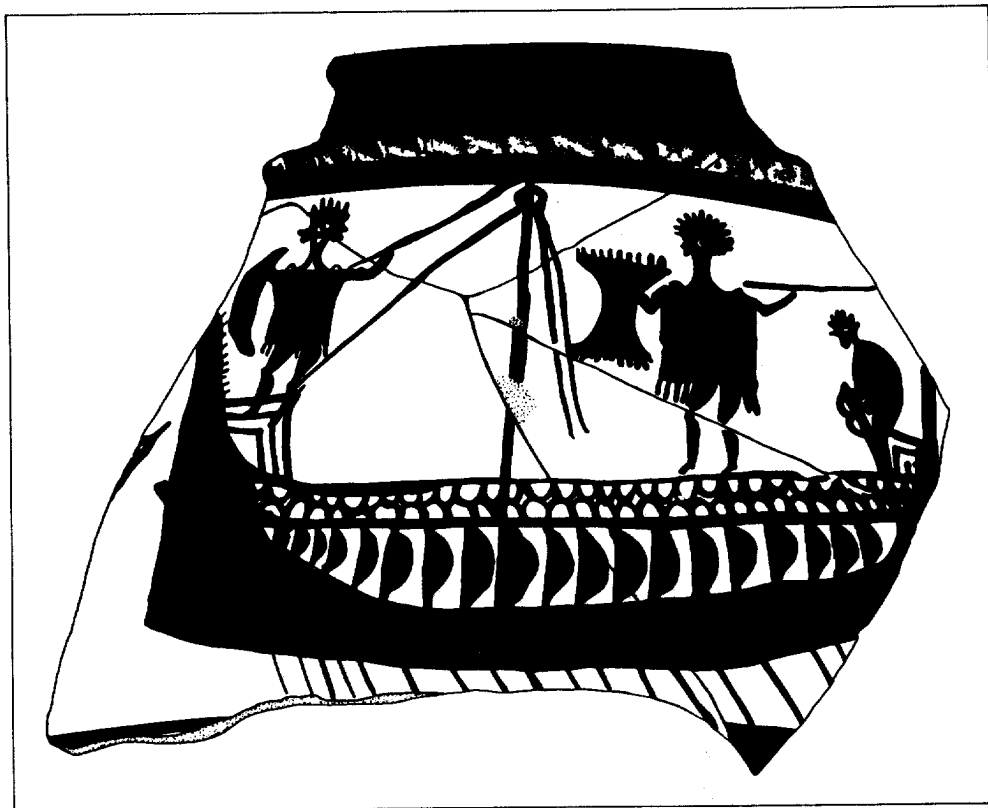
1. The artist perceived of the human body when out of armour as curving and sinuous. This is evident from the ship's helmsmen who, unlike the two warriors, is shown without armour.
2. The rowers are depicted at the end of their stroke, with the oar blades slanting towards the

69. Dakoronia 1990.

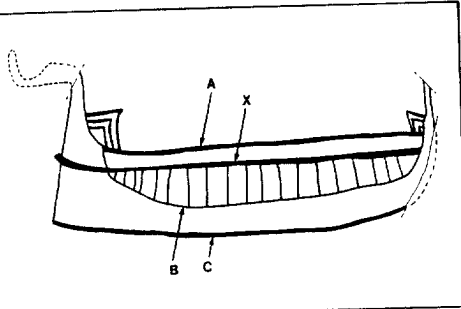
70. Dakoronia 1993.



This element seems to have been so striking to the observer that some sketches of Mycenaean ships bear little else than this 'horizontal ladder pattern', sometimes with oars and rigging added. For example, ship A is painted on a sherd from Phylakopi on the island of Melos, and ship B is painted (upside-down) inside a Late Minoan larnax (ossuary). (A after Marinatos 1933; B after Gray 1974)



The Kynos ship; Late Helladic IIIC. (From Wachsmann, *Seagoing Ships and Seamanship in the Bronze Age Levant*, College Station, Texas, in press)



Architectural details of the Kynos ship.

stern. At this moment in the stroke, the rowers' torsos would be thrown back, with their oars drawn up near their bodies. Rowers in this position in Late Geometric art are portrayed leaning strenuously backward on their benches. As the torsos are depicted in frontal view, the far shoulder appears forward.

Thus, it seems reasonable to assume that the lunettes represent the rowers' upper torsos. But if so, where then are their heads? There is general agreement among scholars that later Greek oared ships, which reappear in the ninth century BC, are a direct continuation of the Mycenaean tradition of ship construction.⁷¹ Unfortunately, this scholarly agreement does not extend to the ships that appear on Late Geometric vessels, for which several interpretations have been proposed.⁷² It would be imprudent, therefore, to use these later images to explain the Kynos ship. There are, however, three depictions of Greek oared ships, all of which date to the last decade of the Late Geo-

An oarsman at the end of his stroke; Attic Late Geometric I. (After Basch 1987)

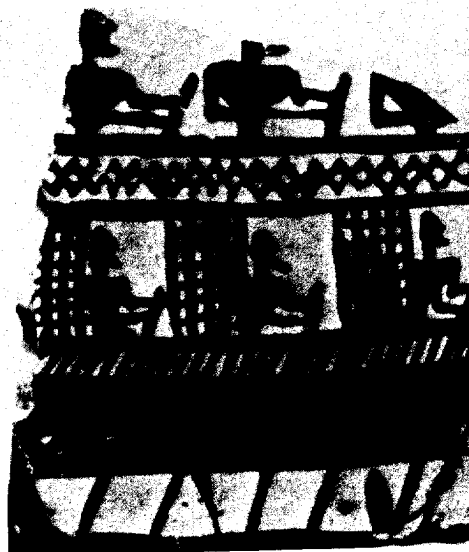


metric period, c710–700 BC, on which there is scholarly agreement that they represent two-banked ships (*dieres*). These three images allow us to solve the 'mystery' of the 'headless oarsmen'.

One depiction, painted on a Proto-Attic sherd from the Acropolis of Athens, shows the lower-level oarsmen appearing in an open rowers' gallery partly protected by screens. A second sherd shows part of a *dieres* in which the torsos of the lower-level oarsmen are hidden behind screens. The height where their arms meet their bodies, however, indicates that their heads must be hidden behind the horizontal strip (deck-level wale?) located above them. Were there to be any doubt in the matter, the third *dieres* fragment, painted on a sherd from Phaleron, closes the case. For here the lower-level rowers are depicted *between* the protective screens, and their heads are clearly hidden behind the superstructure.

The above evidence permits the conclusion that the lunettes were indeed intended by their creator to represent the torsos of the ship's rowers. Furthermore, it also allows us to conclude that the 'horizontal ladder motif' on Mycenaean ships represents an open rowers' gallery intersected 'by a row of stanchions which supported the free-standing wale into which the deck beams were keyed. The Kynos artist, in indicating that the oarsmen's heads were hidden by the screen, has given us a further clue concerning the open rowers' gallery – its height was equivalent to that of a man's torso from the hip to the neck.

Two-level warship painted on a sherd from the Acropolis, Athens c710–700 BC. (Photo from Morrison and Williams 1968)



Warship with two levels of oars depicted on a sherd from the Acropolis, Athens, c710–700 BC. (Photo from Morrison and Williams 1968)

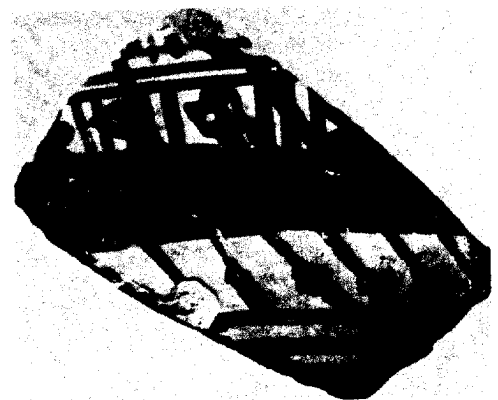
In an additional ship image uncovered at Kynos, the ship's stanchions are omitted and the oars seem to be attached at deck level. This strongly suggests that Mycenaean galleys, like Late Geometric warships, could be rowed from deck level.⁷³ The warrior standing abaft the mast on the first Kynos ship indicates that the vessel was at least partly decked. While this ship probably ran the length of the ship from stern to stern, the deck could not have run the entire beam of the ship as this would have left no room for the rowers' heads. Planking must have been left out along the sides. Additionally, this ship bears light castles positioned at the

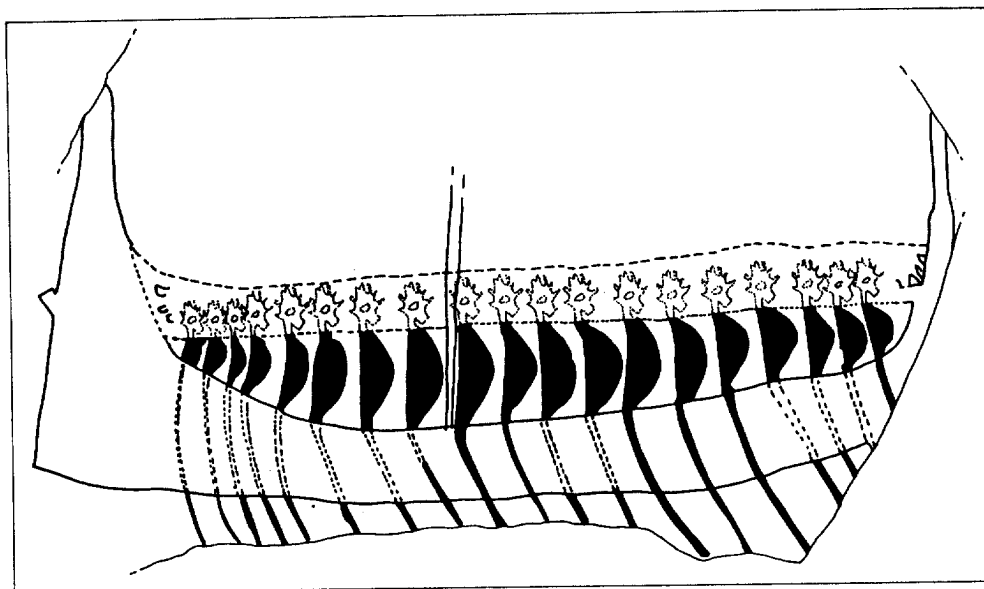
71. The continuation of the Mycenaean ship tradition into Geometric times is the strongest argument for continuation during the Dark Ages. On the problem of cultural continuation during the Dark Ages, see most recently Lenz 1993.

72. Kirk 1949, pp123–131; Morrison and Williams 1968, pp12–17; Casson 1971, pp71–74; Basch 1987, pp161–170. The following interpretation agrees entirely with Casson's reading of late Geometric warship construction.

73. On the Late Geometric evidence, Casson 1971, p55.

A two-level warship depicted on a Proto-Attic sherd from Phaleron. (After Williams 1959)





Conceptual reconstruction of the Kynos ship. Torsos of the rowers are depicted as lunettes which are seen through the open rowers' gallery (area XB in architectural drawing above). Area AX was probably a

leather screen rising from deck height, which would have hidden the rowers' heads in a manner similar to that seen on images on pottery sherds of late eighth-century BC Greek warships.

Ship depicted on a Late Helladic IIIC sherd from Kynos. (From Wachsmann, *Seagoing Ships and Seamanship*

in the Bronze Age Levant, College Station, Texas, in press)



stem and the stern. The helmsman mans a single quarter rudder which lacks a tiller. Two joined semicircles, however, may represent some form of steering mechanism.

There are numerous depictions of Mycenaean ships. One, painted on a pyxis from a twelfth-eleventh century BC tomb at Tragana, near Pylos, bears a striking similarity to the Kynos ships. Twenty-five rowers' stations in the open rowers' gallery indicate that the artist intended to depict a penteconter, one similar to those perhaps used by the oarsmen in Pylos An 610 and An 724. The ship carries mast and sail, and the recent discovery of missing sherds indicates that the ornament standing atop the forecastle represents a bird, rather than a fish as was previously thought.⁷⁴ A contemporaneous ship image painted on a stirrup-jar from the island of Skyros probably depicts a similar type of ship, this time with a more common bird-head stem ornament. Oarsmen remain forever at their oars on a sherd from the island of Cos.

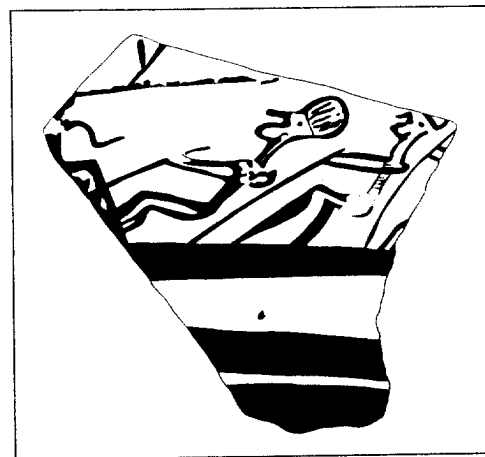
Iconography supplies us with a valuable view of the general appearance of Mycenaean war galleys. We remain woefully ill-informed, however, concerning the manner in which these ships were constructed. Depictions of Mycenaean ships seem to form a cohesive group, but the ships exhibit considerable variety.

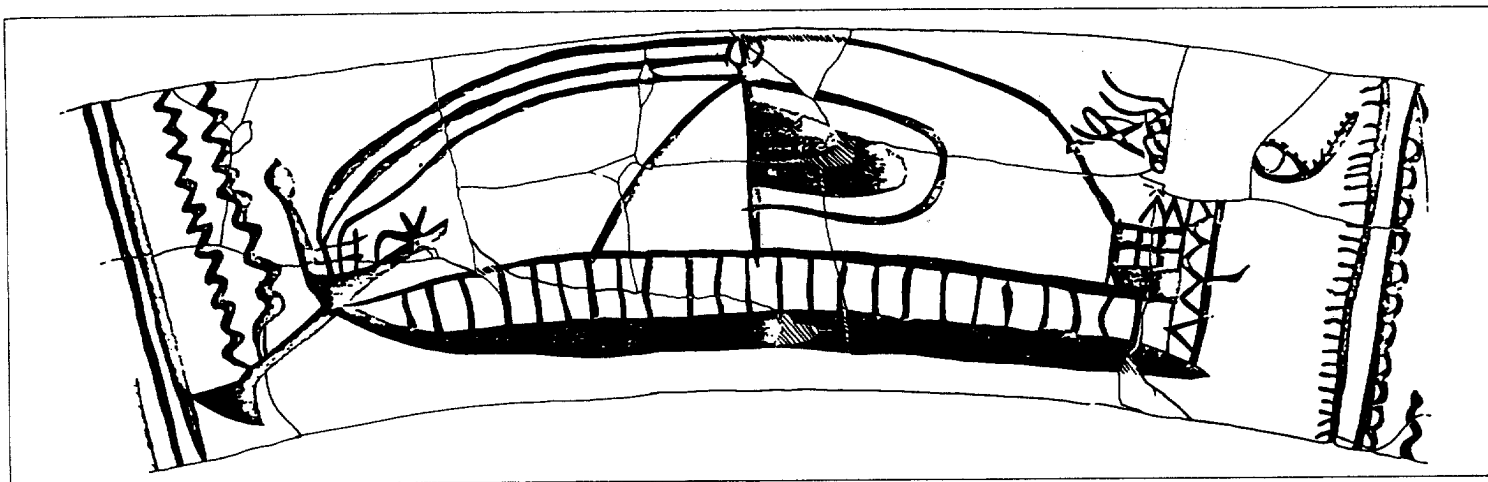
The Sea Peoples

In the eighth year of his reign, c1176 BC, the Egyptian pharaoh Ramses III defeated a coali-

74. Korrés 1989.

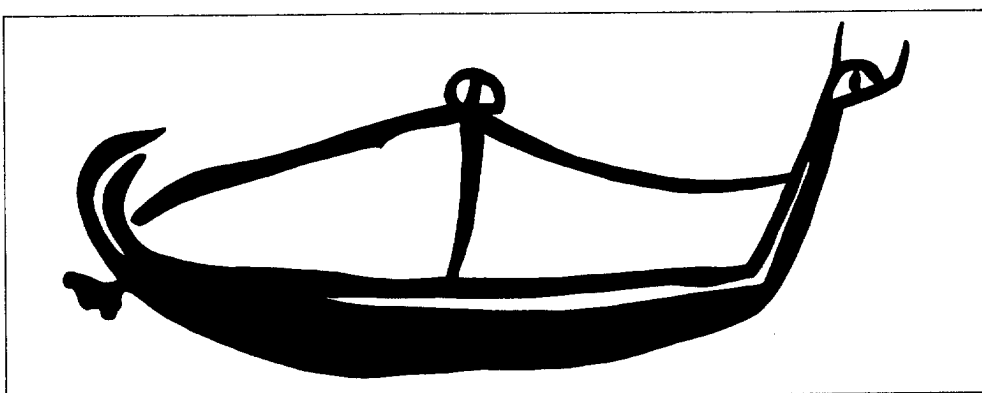
Oarsmen bend to their oars on a fragmentary ship image on a Late Helladic IIIC sherd from the Seraglio on Cos. Note the feather (?) helmets. (After Morricone 1975)



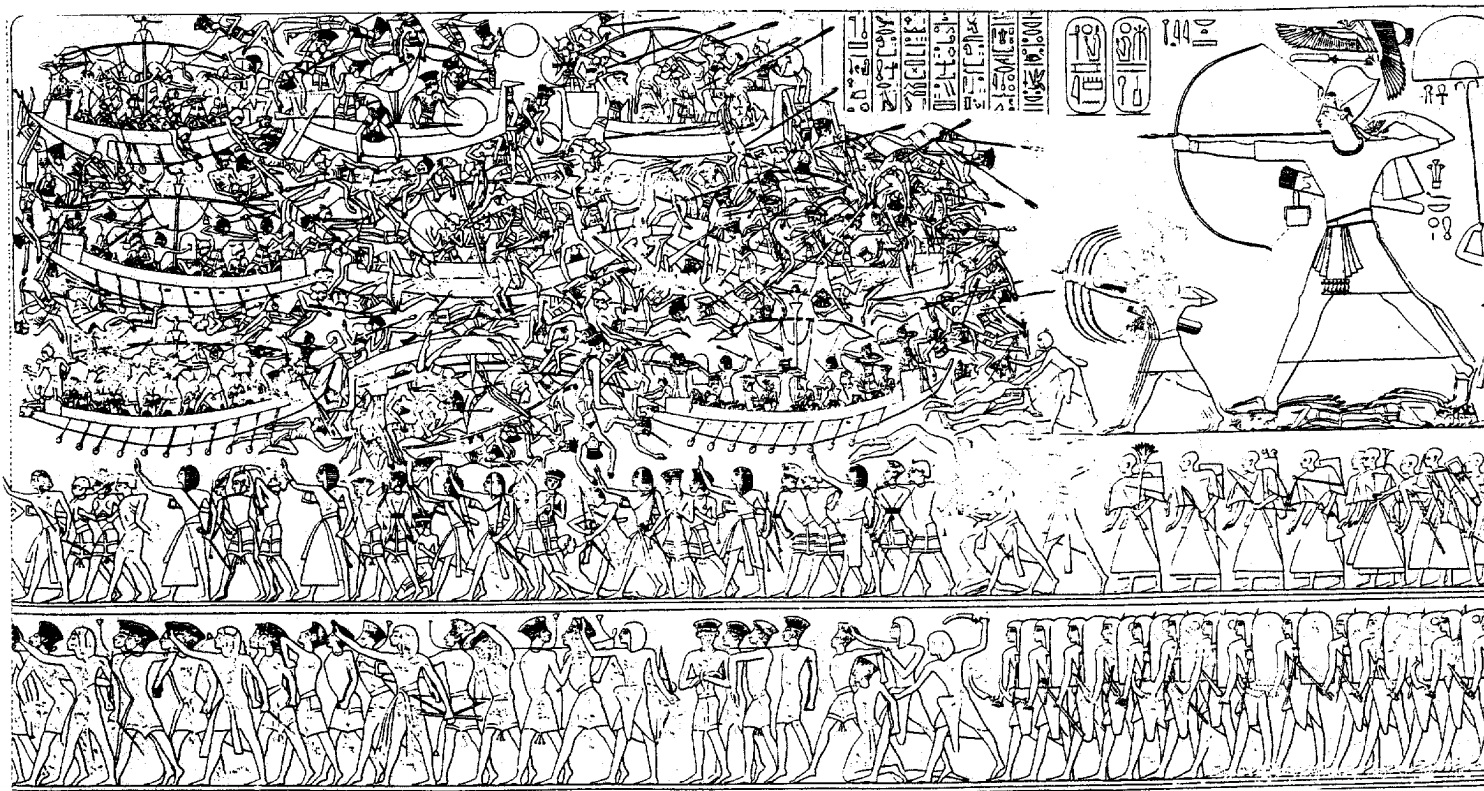


Ship image painted on a pyxis from a Late Helladic IIIIC tomb at Tragana, near Pylos. (After Korrés 1989)

Ship image painted on a Late Helladic IIIIC stirrup jar from the island of Skyros. Note the bird-head image topping the stem. (After Hencken 1968)



Ramses III's naval engagement against the coalition fleet of the Sea Peoples. (From Nelson et al 1930)

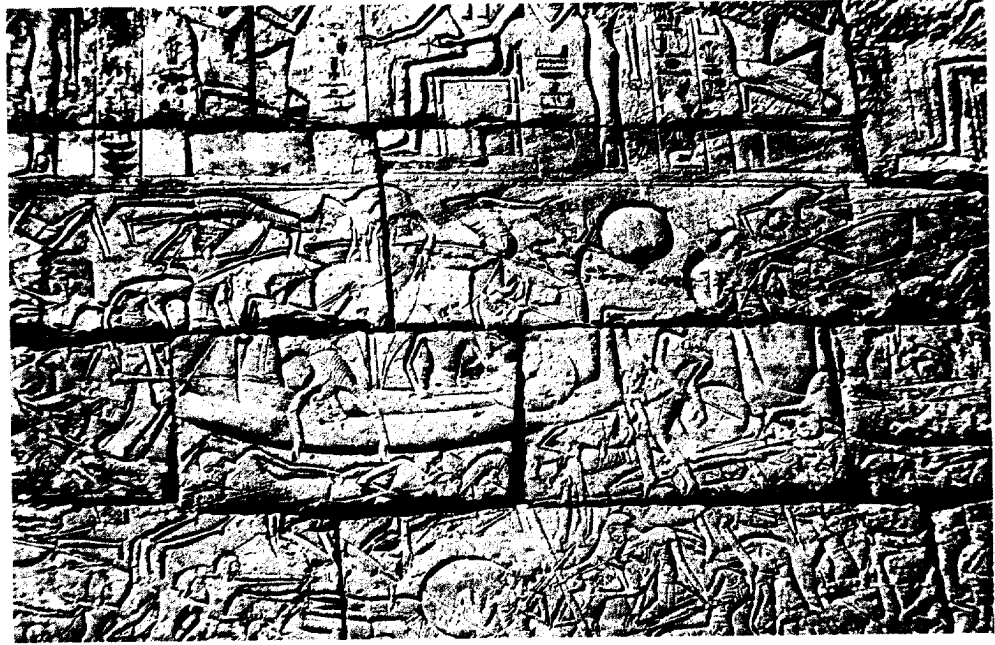


tion of migrating invaders who were known to the Late Bronze Age cultures collectively as the Sea Peoples. In two battles, one on land and the other on water, Ramses III successfully repulsed their advance. He recorded his victories in remarkably vivid painted reliefs on the walls of his mortuary temple at Medinet Habu.⁷⁵

The scene of the nautical battle at Medinet Habu is illustrative of naval warfare prior to the introduction of the waterline ram as the pre-eminent nautical weapon. The sails of the Sea Peoples' ships are brailed up and no oars are visible. Presumably, the invading fleet was surprised at anchor by the Egyptians; the accompanying text suggests an Egyptian trap into which the invaders fell.⁷⁶

Although the scene has a snapshot-like quality, Nelson has demonstrated that the cohesion of the battle revolves around spatial, ideological and temporal conceptual elements.⁷⁷ There is the impression of a vigorous naval battle, but within this construction the artists depicted four phases of the conflict. Egyptian ship E1 and Sea Peoples' ship N1 represent the beginning, ships E2 and N2 the middle phase, and ships E3 and N3 the conclusion of the battle in which the invaders are defeated and their ships capsized. Ship E4 signifies the aftermath of the battle, in which the shackled prisoners are carried off to the victory celebration. Two other Sea Peoples' ships, N4

The scene of the naval battle with the bodies removed.
(From Nelson 1943)



Detail of Ramses III's naval battle. (B Brandle)

and N5, which are juxtaposed to Ramses III, indicate the pharaoh's ideological unstoppable power to utterly destroy and vanquish his enemies.

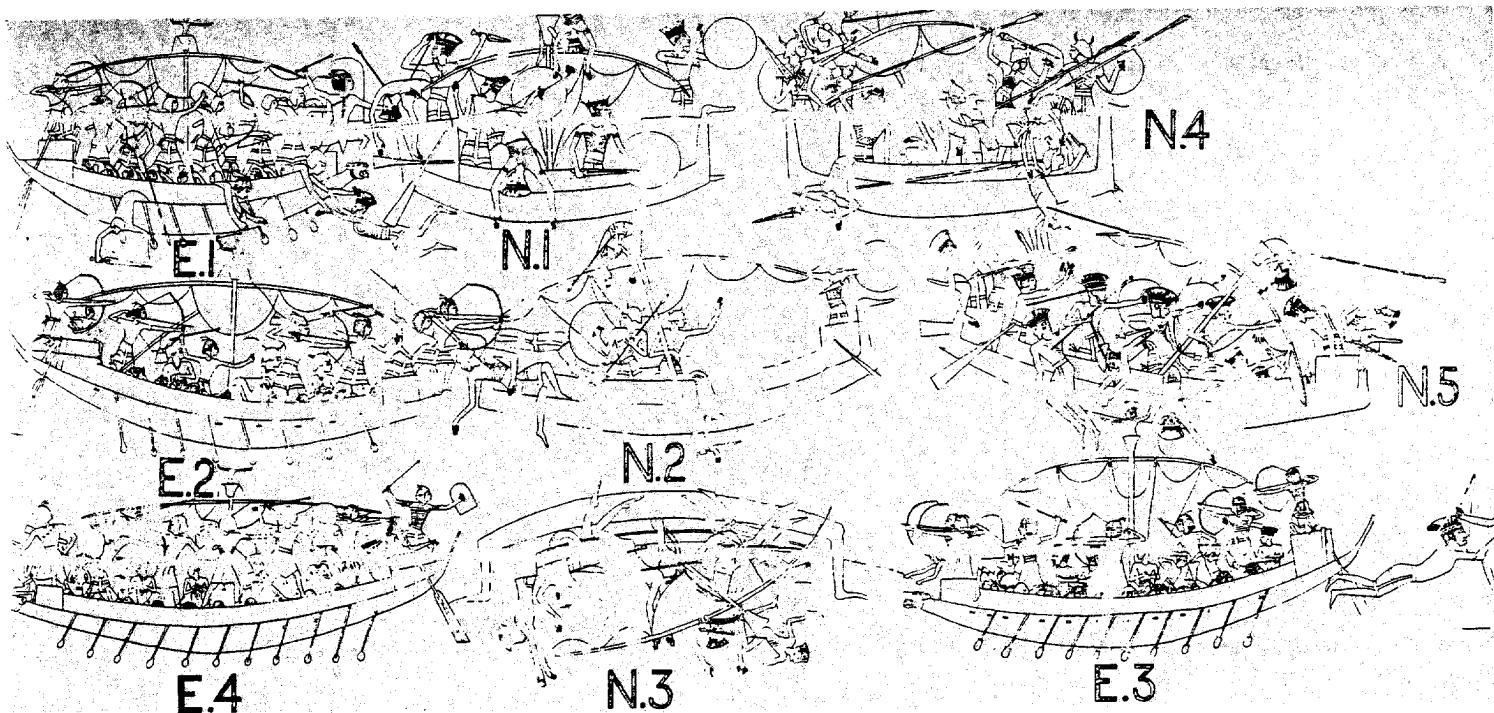
All five northerner ships illustrate a single type of ship, even though the invaders in them belong to two distinct groups, one of which wears a horned helmet, and the other a helmet

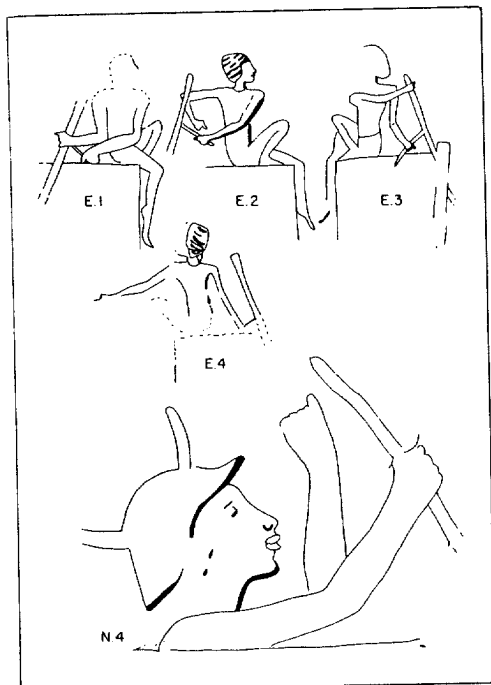
with feather-like protrusions. Clearly the invaders' vessels have been stereotyped into only one form. Similarly, only one type of Egyptian

75. Wachsmann 1981; 1982.

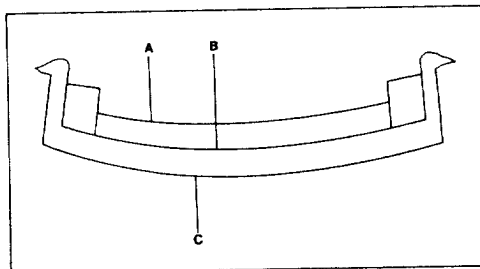
76. BAR IV, § 77.

77. Nelson 1943.





The helmsmen of ships E1-E4 and N4 (After Nelson et al 1930)



The three horizontal lines on ships N1-2, 4 and 5.

alone. This manner of handling the quarter rudder may be compared with that used by the helmsmen of the four Egyptian vessels, all of whom hold the tiller in their left hands, while two hold the oar's loom with their right hands.

The loss of paint may partly explain the differences among the various renditions of what is undoubtedly a single Sea Peoples' ship. It also may explain why some elements are inconsistent, even on the same ship. The bird-head capping the stern of ship N2, for example, is eyeless, while the head atop the stem has a carved eye. Furthermore, the brails are depicted on only one side of the mast. Detail may have been applied in some areas in relief and paint, while in others solely in paint. Furthermore, corrections were made on plaster that was applied to the relief. In some cases we apparently have only the original draft, while the final rendition that had been carved into the plaster has long since crumbled away.

It is possible to determine the construction of the invaders' ships by a careful study of the manner in which the bodies of the dead and dying warriors are draped over the ships' archi-

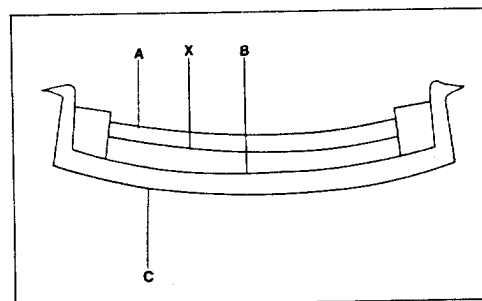
tecture. The ships are being depicted in sheer view. Four of the hulls – ships N1, N2, N4 and N5 – are defined by three horizontal lines. Dead bodies bent over the near side of the ships cross lines A, B and C, indicate that the ships themselves are seen in sheer view.

Initially these seem to delineate the hull and a screen, as on the attacking Egyptian ships. Arguing against this interpretation, however, is line B, which sometimes serves as a base-line, directly above which the bodies of warriors appear:

1. One warrior, in the process of being speared, lies on line B in ship N2. This is not accidental as his left leg also rests on the same line. Next to him, another warrior falls head first, his left arm seemingly disappearing behind line B.
2. In ship N4 the helmsman and a second

78. See Nelson's (1929, p22) description of another war scene at Medinet Habu where the paint has been preserved.

The four horizontal lines on ship N3.

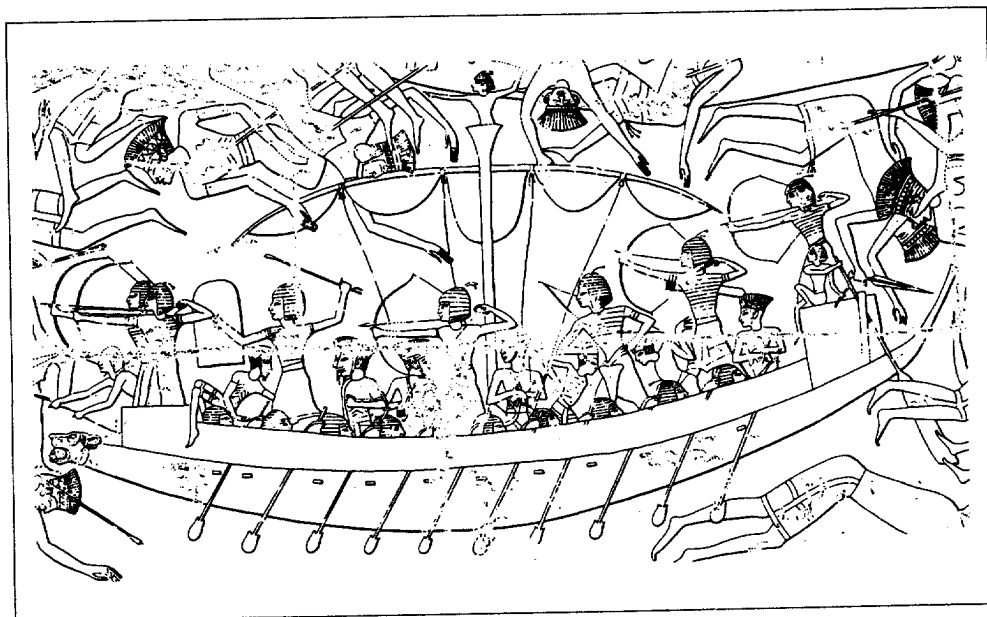


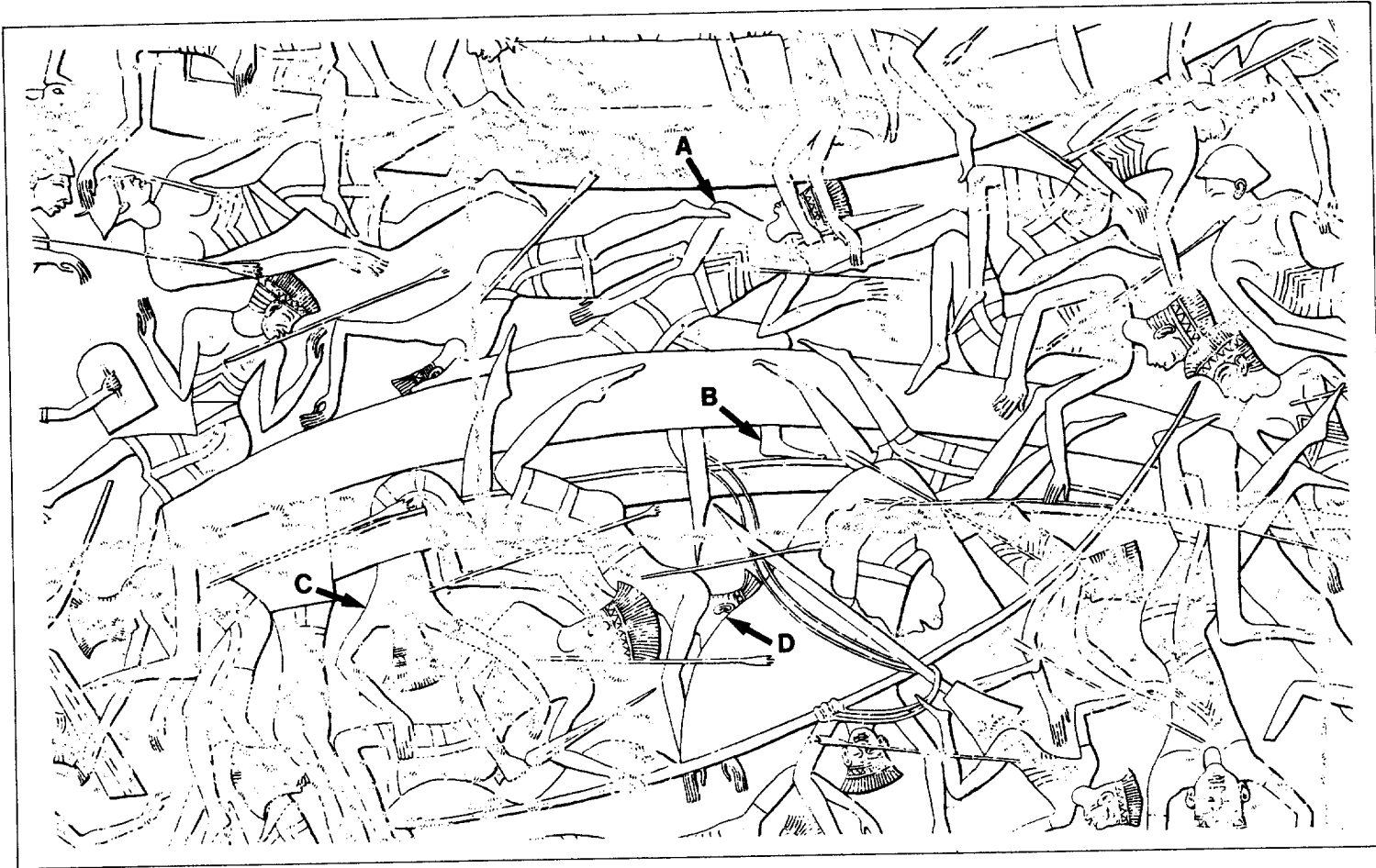
vessel is portrayed, even though an accompanying text indicates that at least three different types took part in the engagement. Thus, it is important to remember that the scene depicts five illustrations of a single ship. These images of an invading ship were probably based on field sketches prepared by an Egyptian army artist after the battle.

The scene of the waterborne engagement contains the most detailed known depictions of a type of ship used by the Sea Peoples. Although the engagement was originally a painted relief, the paint has long since disappeared. As the Egyptian artists in this art form did not specifically differentiate between relief and paint, a certain amount of detail has been lost with the paint. There is some indication to suggest that in this particular Egyptian art form, painting dominated the carved relief. Now, only by comparing portions of the temple where the paint has been preserved does it become clear how much detail has probably been lost together with the paint.⁷⁸

This phenomenon is clearly seen in the manner that the helmsman in ship N4 grasps the loom of the oar with his right hand while his left holds a now non-existent tiller which must have been originally applied in paint

An Egyptian ship taking part in the naval battle that Ramses III fought against the Sea Peoples. (Detail from Nelson et al 1930)





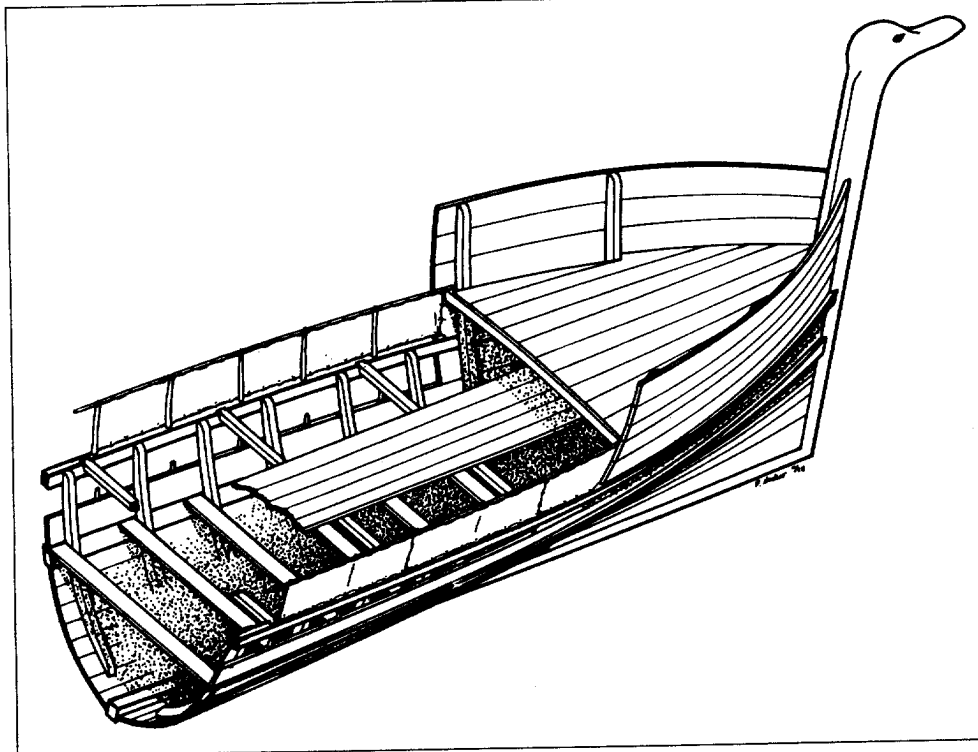
Ship N3. (Detail from Nelson *et al* 1930)

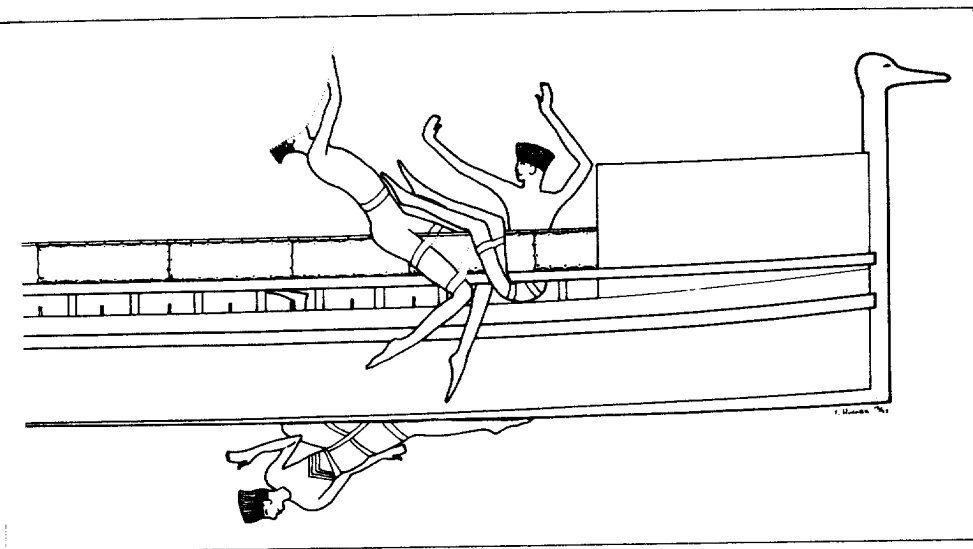
fallen comrade appear directly above line B. The latter is succored by a warrior standing at a higher level, who bends over line A. This indicates that the Egyptian artist wished to portray these ships as having two levels. That is, the vessel must have been at least partially decked amidships.

These considerations argue that something is lacking in these depictions. And indeed, the 'missing link', a fourth horizontal line (X), appears on ship N3 between lines A and B. The ship's principal architectural characteristics may be determined by studying how three of the warriors are positioned in relation to the three resultant horizontal areas (AX, XB and BC):

1. One warrior lies astride the ship's capsized hull (A). His right leg is stretched out behind him. His left leg disappears behind the hull

Tentative isometric reconstruction of a Sea Peoples' ship portraying the primary elements of the ship's architecture as indicated by the bodies of the dead warriors. (Drawing by F M Hocker)

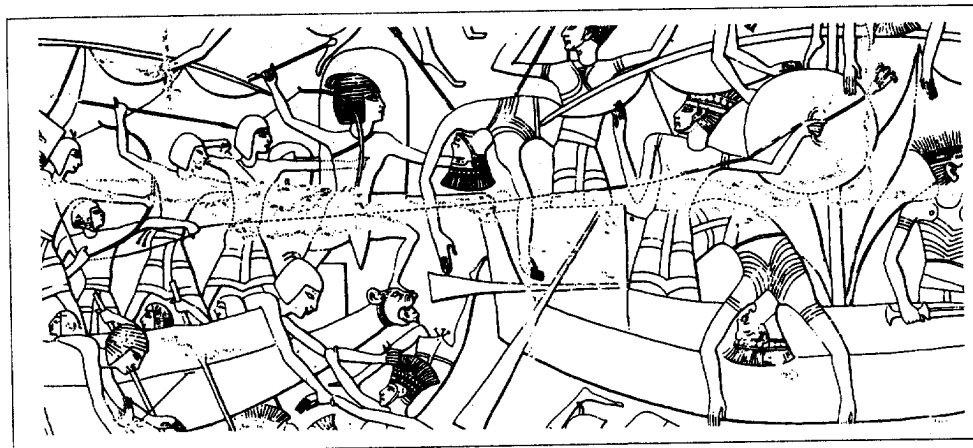




Top: Tentative sheer view of a Sea Peoples ship with the three bodies of warriors in ship N3 added to better illustrate the constructional elements. Note that the bodies are depicted in a scale larger than that of the ship. (Drawing by F M Hocker)

Centre: Standing amidships in ship E1, an Egyptian sailor casts a four-toothed grapnel into the rigging of Sea Peoples ship N1. (Detail from Nelson et al 1930)

Bottom: Sea Peoples ship N3 is capsized by means of the grapnel attached to the bow of Egyptian ship E3. (Detail from Nelson et al 1930)



(area BC), but his foot reappears in area XB (B).

2. A second warrior (C) is 'wrapped around' area AX; his torso disappears behind line X but his lower abdomen and legs reappear in area XB.

3. The left leg of a third figure (D) reappears from behind line X and crosses lines B and C. This warrior seems to be straddling area AX.

Here, then, are three independent clues that point to a single conclusion: *area XB represents an open space*. The only rational explanation for

such an exposed space is that this ship type must have had an open rowers' gallery, through which the oarsmen worked their oars. Above this was a screen (area AX) and below it the hull from caprail to keel (area BC). By adding line X to the ships N2 and N4, the positioning of the figures is made clear. Although no stanchions are depicted, the prototype ship must have carried them, for otherwise there would have been nothing to support the screen and deck beams. Perhaps the stanchions had been depicted in paint only. Alternatively, the Egyptian artists may have left them out to prevent the scene from becoming too burdened with detail.

The single most important conclusion from this evaluation of the Sea Peoples' ship depictions at Medinet Habu is that they seem to be virtually identical in composition to the Helladic galley type typified by the Kynos ship discussed above. In other words, the Sea Peoples seem to have adopted the use of a Mycenaean ship type. There is, however, one difference between the two ship types: the bird-head devices. Mycenaean ships have bird or bird-head devices commonly placed atop the stem. The Sea Peoples' ship images have bird-head devices atop their sternpost facing astern. In this, the latter resemble most closely the 'bird-boats' of the Central European Bronze and Iron Age cultures.⁷⁹

Naval warfare in the Late Bronze Age

The waterline ram did not come into use until well after the Bronze Age had run its course. This being the case, how were galleys employed in naval battles prior to the introduction of the ram? We know of several battles that took place during the Late Bronze Age. Our main source of information for how battles were fought, however, is derived from

79. Wachsmann, forthcoming B.

Ramses III's Medinet Habu reliefs. This conflict was not totally a sea battle, as it appears that some of the forces that took part were contingents of archers on the shore. Egyptian archers, armed with composite bows, were used to good advantage. The bowmen, and slingers, were able to pick off the invading warriors while staying beyond range of the latter's javelins. Once the enemy had been neutralised, the ships closed in. Interestingly, the only specifically nautical weapon depicted in the relief is a four-armed grapnel.

The ships are depicted in a typically Egyptian manner, from two different points of view: the hulls in profile, but the mast and rigging frontally.⁸⁰ Although the profiles of the Sea Peoples' ships seem to be upright in the water, actually, by tilting the ships' masts, the Egyptian artists indicated that these ships were in the process of being capsized.

Ships E1 and N1, which signify the beginning of the battle, are portrayed next to each other. Ship N1's mast is still upright. As the Egyptian ship comes abeam the anchored (?) Sea Peoples' ship, a sailor located amidships tosses a grapnel into the enemy's rigging. There then follow three depictions of a Sea

Peoples' ship – N2, N4 and N5 – with the masts askew at varying angles. These represent the slanting deck as the ships are capsized. To add further emphasis to the pandemonium inherent in the progressive capsizing of a ship, the artists depicted the invaders in a variety of unusual positions, falling backwards and forwards, grabbing on to the mast for dear life, and lying on the side of the hull.

In the final phase, illustrated by N3, the ship has capsized and the mast has broken off. Once again the grapnel's rope is depicted, although the grapnel itself is lost in the rigging. Now, however, the rope is attached to the bow of the opposing Egyptian ship (E3). This may indicate that once the grapnel had caught in the

enemy's rigging, the Egyptians moved their ships perpendicular to the enemy and backed water.⁸¹ The final figure illustrates the varying lists on the basis of the angles of the masts to the horizon.

Shelley Wachsmann

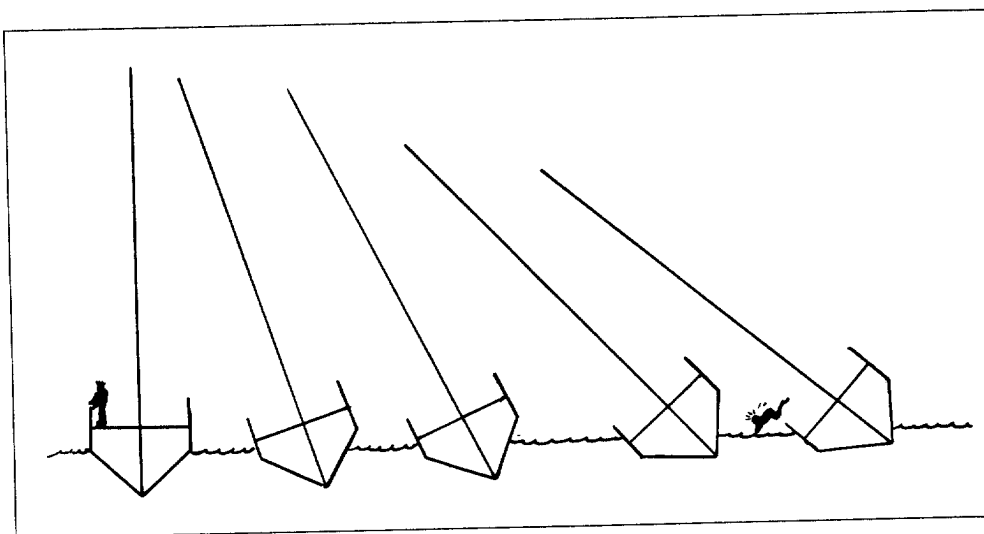
Acknowledgements

I wish to thank Professor Morrison for inviting me to contribute to this book. Thanks also to my colleague, Dr Frederick M Hocker for preparing the drawings of a Sea Peoples' ship that appear on pages 32–33.

80. Strictly speaking, they are seen from astern.

81. On backing water see Tilley 1992.

By showing the ships' progressively tilting masts en face, as well as by indicating the chaos onboard the ships as they were overturned, the Egyptian artists were able to illustrate the worsening list of the invader's ships in the process of being capsized by the Egyptian forces. The mast of N4 is reversed left to right. The angle of N3 is based on the upper part of the broken mast. The angle is based on that between the mast and the horizon.



References and abbreviations used in the footnotes

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AJA = *American Journal of Archaeology*

ANET³ = *Ancient Near Eastern Texts Relating to the Old Testament* (Third edition with Supplement), ed J B Pritchard (Princeton 1969).

ARAB = D D Luckenbill *Ancient Records of Assyria and Babylonia I–II* (New York; reprint 1968).

BAR = *Ancient Records of Egypt, I–V*, ed J H Breasted (Chicago 1906–1907; 1988 reprint).

BCH = *Bulletin de correspondance hellénique*

IJNA = *International Journal of Nautical Archaeology*

JEA = *Journal of Egyptian Archaeology*

JHS = *Journal of Hellenic Studies*

JMA = *Journal of Mediterranean Archaeology*

JNES = *Journal of Near Eastern Studies*

LAE = *The Literature of Ancient Egypt: An Anthology of Stories, Instructions, and Poetry*, ed W K Simpson,

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PM = A Evans, *The Palace of Minos I–IV* (London. 1921–1964).

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